SEE NOTICE ON FIRST PAGE

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ENTRIES 3266-4895

M. J. Dorsey

BOTANICAL ABSTRACTS

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UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. Schramm, Editor-in-Chief
National Research Council, Washington, D. C.

Vol. 11 SEPTEMBER–OCTOBER–NOVEMBER, 1922 No. 4
ENTRIES 3266–4895

AGRONOMY

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(See also in this issue Entries 3393, 3396, 3434, 3474, 3511, 3607, 3620, 3628, 3630, 3631, 3855, 3856, 3857, 3865, 3866, 3867, 3895, 3896, 4057, 4089, 4302, 4337, 4437, 4454, 4495, 4496, 4552, 4557, 4584, 4590, 4657, 4679, 4694, 4741, 4748, 4755, 4756, 4764, 4765, 4784, 4880)

3266. Anonymous. **Corowa growing crop competition.** Agric. Gaz. New South Wales **33**: 250–252. 1922.—An account of a competition for the production of the best 40 acres of wheat is given. The crop was scored as follows: yield, 40; typeness, 20; freedom from disease, 20; freedom from weeds, 10; evenness, 10. Ten competitors finished. The Bomen variety was entered by 4 competitors.—*L. R. Waldron.*

3267. Anonymous. **El cactus Burbank. [The Burbank cactus.]** Rev. Agric. Com. y Trab. [Cuba] 5^1: 31–32. 1922.—The author reviews the value of the plant in certain localities and discusses methods of propagation. The cactus is considered of little use in Cuba on account of abundant pasture of better forage.—*G. R. Hoerner.*

3268. Anonymous. **La yuca, fuente de riqueza. [The yuca, a source of wealth.]** Rev. Agric. Com. y Trab. Cuba 5: 7. 1922.—A brief note is presented on recent investigations of the value of products of this plant [cassava] for human consumption.—*G. R. Hoerner.*

3269. Anonymous. **Melilotus alba as a green manuring crop.** Agric. Gaz. New South Wales **33**: 360. 1922.—At Hawkesbury Agricultural College grey field peas surpassed sweet clover as a green manuring crop. The yield of the sweet clover was estimated at 3 tons per acre and the yield of field peas was calculated at 10 tons.—*L. R. Waldron.*

3270. Anonymous. **Sugar experiments. Summary of twenty-one years' work.** Australian Sugar Jour. 14: 33–35. 1922.—A preliminary summary is given of deep-cultivation experiments in cane fields extending over a period of 21 years. Subsoil cultivation upon alluvial soils, such as at Mackay and those with clay subsoils, was advantageous. Subsoiling experiments upon the open porous red soils of Bundaberg and Isis have never given good results. Different methods of subsoiling treatment were tried both with plant and with ratoon crops.—*C. Rumbold.*

3271. Anonymous. **Una leguminosa forrajera perenne de varios cortes anuales.** [A perennial leguminous forage plant of several cuttings annually.] Rev. Agric. Com. y Trab. [Cuba] 5^3: 15. 1922.—The value of *Meibomia Rensoni* Paynter (*Desmodium Rensoni*) as compared with other importations tested under Cuban conditions is discussed. This Central American species has proved of great promise as a Cuban forage plant. [See also Bot. Absts. 11, Entry 3289.]—*G. R. Hoerner.*

3272. Adams, R. L. **Farm management.** *671 p., illus.* McGraw Hill Book Co.: New York, 1921.—The book is an extensive presentation of the place and scope of farm management, including recommended and actual farm practices in improving soil quality with green manures, commercial fertilizers, stable manures, crop rotations, cropping systems. Selection of crops for given conditions, diversified contrasted with specialized farming, costs of producing crops, and profits from crops are discussed.—*C. V. Piper.*

3273. Addis, José M. **Experimentos con malangas.** [Experiments with dasheens.] Rev. Agric. Com. y Trab. [Cuba] 4: 537–541. 1921.—Further experimental work has been carried out at the Cuban experiment station with dasheens (*Colocasia*). Plantings of a series of strains of the variety Blanca were made in order to select those giving highest yields. The results are given in tabular form. Other plantings were made in order to ascertain the influence of size and shape of seed tubers on yield. Large tubers gave highest yields. In a planting of the 4 varieties Japonesa, Rosada, Trinidad and Morada, Rosada gave the highest yield.—*John A. Stevenson.*

3274. Albrecht, Wm. A. **Viable legume bacteria in sun-dried soil.** Jour. Amer. Soc. Agron. 14: 49–51. 1922.—Soil containing *Pseudomonas radicicola* was effective for inoculation if dried in the absence or presence of direct sunlight or if stored dry for 30 months, and was as good for inoculation purposes as fresh moist soil gathered from the field. Hence, direct sunlight and desiccation are not destructive to this organism in its native habitat as has been commonly believed.—*F. M. Schertz.*

3275. Ames, C. T. **Alfalfa culture.** Mississippi Agric. Exp. Sta. Circ. 43. *4 p.* 1921.—General recommendations for alfalfa growing in North Mississippi are given.—*J. Fred O'Kelly.*

3276. Ames, C. T. **Report from Holly Springs Branch Experiment Station for 1921.** Mississippi Agric. Exp. Sta. Bull. 202. *29 p.* 1921.—This bulletin reports variety tests with corn, cotton, sweet potatoes, and alfalfa; fertilizer tests with cotton and corn; cotton spacing and cultivation; recommendations concerning erosion, permanent pastures, and forage crops.—*J. Fred O'Kelly.*

3277. Arny, A. C., and F. W. McGinnis. **Methods of applying inoculated soil to the seed of leguminous crops.** Jour. Amer. Soc. Agron. 13: 289–303. 1921.—In order to reduce the labor and expense involved in transferring soil containing legume bacteria to new fields, the practice of causing a small quantity of soil containing the necessary organisms to adhere to the seed has been recommended and widely used. The method consists of moistening the seed with a weak glue solution and then dusting on 1 bushel of seed approximately 1 pound of finely sifted, air-dry soil known to contain the desired bacteria. The results from this method have been quite variable. Water only and glue or sugar solutions of various strengths are not recommended. Equal weights of soil and seed mixed together and sown gave satisfactory inoculation as indicated by large nodules and a dark green, thrifty foliage growth. With 1 exception a commercial culture gave results similar to, and frequently more marked than, the use of equal amounts of soil and seed. Storage after the inoculum was applied did not result in a serious lowering of the nodules secured per plant. It is recommended that exposure to sunlight be avoided whenever possible.—*F. M. Schertz.*

3278. Bailey, C. H. **The character of 1919 crop spring wheat dockage.** Jour. Amer. Soc. Agron. 14: 88–93. 1922.—Four hundred samples of Minnesota wheat contained an average of 1.57 per cent of wild oats and 2.84 per cent of fine seeds and dirt. In addition considerable shrunken or shriveled wheat was found in the fine dockage. Inseparable seeds were found in varying percentages.—*F. M. Schertz.*

3279. Bartlett, H., Mark H. Reynolds, and W. R. Birks. **Farmers' experiment plots. Wheat and oat experiments, 1921.** Agric. Gaz. New South Wales **33**: 153–169. 2 fig. 1922.—In the western district experiments were conducted cooperatively on 10 farms with 25 wheat and 4 oat varieties. Canberra, Hard Federation, and Federation varieties of wheat and Algerian and Sunrise varieties of oats generally gave the best yields. Hamel wheat, newly originated in West Australia, showed much promise. It is emphasized that stud seed of the important varieties should be produced each year to prevent variety deterioration.—In the northwestern district best results were secured from Canberra, Clarendon, and Hard Federation varieties of wheat. The fact that "foot-rot" and "take-all" attack grasses commonly grown in meadows adds a difficulty to the method of crop rotation followed by many farmers.—In the central western district, wheat yields varied considerably but the following varieties are recommended for the main wheat areas: Hard Federation, Canberra, Federation, Yandilla King, and Florence. Promising new varieties are: Wandilla, Waratah, Onas, Wilfred, and Major.—*L. R. Waldron.*

3280. Bartlett, H., R. N. Makin, W. D. Kerle, and J. M. Pitt. **Farmers' experiment Plots. Winter green fodder experiments, 1921.** Agric. Gaz. New South Wales **33**: 177–190. *6 fig.* 1922.—Experiments in cooperation with farmers were conducted in 4 regions of New South Wales to popularize mixed farming (sheep and wheat) by introducing a rotation to increase the stock carrying capacity of the farm. The crops used were mainly cereals,—wheat, oats, and barley, either alone or mixed with rape, peas, or vetches. Best yields, as a rule, were secured from some combination of cereal and legume rather than from any cereal alone.—*L. R. Waldron.*

3281. Birks, W. R. **Coonabarabran field wheat competition.** Agric. Gaz. New South Wales **33**: 173–175. 1922.—A description of methods used and a tabulation of the scorings are given in this annual field wheat competition. Six farmers competed.—*L. R. Waldron.*

3282. Blake, S. F. **Two new western weeds.** Science **55**: 455–456. 1922.—*Bassia hyssopifolia* (Pall.) Kuntze is reported from very alkaline soil in Nevada and other states. *Centaurea picris* Pall. is reported from Idaho, where it is becoming a serious pest.—*C. J. Lyon.*

3283. Bornemann. **Düngungsversuch mit heissvergorenem Stallmist. [Manuring studies with stable manure fermented at high temperatures.]** Mitteil. Deutsch. Landw. Ges. **37**: 38–40. 1922.—Stable manure was handled in such a way that a rapid rise in temperature took place. When the temperature had reached the desired point the manure was packed down and a new layer added. It is said that in 1 series of trials manure prepared in this way produced much larger yields of potatoes and with a higher nitrogen content than did common stable manure.—*A. J. Pieters.*

3284. Breakwell, E. **Popular descriptions of grasses.** Agric. Gaz. New South Wales **33**: 191–197. *4 fig.* 1922.—Three Mitchell grasses belonging to the genus *Astrebla* are described from an agronomic standpoint. These are *A. triticoides* (Curly Mitchell), *A. pectinata* (Bull Mitchell), and *A. elymoides* (Hoop Mitchell). Descriptions are given also of the kangaroo grasses, of which *Anthistiria ciliata* is an example; of native oat grass (*Anthistiria avenacea*), and of Flinders grass (*Anthistiria membranacea*). These grasses are all figured. It is pointed out that these grasses have nearly or quite disappeared from portions of their original habitats.—*L. R. Waldron.*

3285. Breakwell, E. **Top-dressing of pastures. Experiments at Glen Innes experiment farm.** Agric. Gaz. New South Wales **33**: 267–269. 1922.—Fertilizer applications to pasture lands of introduced grasses are of immediate benefit and result in financial gains. Superphosphate and sulphate of potash appeared to be as beneficial as complete fertilizer. Use of these fertilizers induced a comparatively greater percentage of clovers.—*L. R. Waldron.*

3286. BROWN, E. B. **Effects of mutilating the seeds on the growth and productiveness of corn.** U. S. Dept. Agric. Bull. 1011. *13 p., 3 pl.* 1922.—The effects of mutilations of seed coats and endosperms decreased the stand, especially in dehulled seeds; decreased the size of plants; did not definitely affect height at maturity; retarded the development of plants; reduced the average number of ears per plant; lowered the weight of the ears and lessened the yield per plant to the extent of 7–10 bushels to the acre. Mutilated germs were also studied, showing that the entire embryo was not essential to germination, normal plants being developed from seeds cut into half through both embryo and endosperm. In laboratory studies 100 seedlings showing plumule and root development were obtained from 71 seeds sectioned longitudinally. The tip portions of the cross sections developed complete plants, but the crown portions developed nothing and there was no regeneration of one organ from another.—*J. T. Buchholz.*

3287. BROWN, H. B., and J. F. O'KELLY. **Correlation between the yields and prolificness of corn varieties grown in Mississippi.** Mississippi Agric. Exp. Sta. Circ. 40. *4 p., 2 fig.* 1921.—A graphic comparison between plot yield and percentage of 2-eared plants is given.—*J. Fred O'Kelly.*

3288. BROWN, H. B., and J. F. O'KELLY. **Cotton experiments.** Mississippi Agric. Exp. Sta. Bull. 205. *16 p., 2 fig.* 1921.—The authors report variety tests, including a study of earliness as indicated by bloom counts. Ammonium sulphate, nitrate of soda, and calcium cyanamid were found profitable when applied at the rate of 15 pounds available nitrogen per acre, whereas cottonseed meal proved unprofitable. The results with calcium arsenate in water and syrup solutions for boll weevil control were not satisfactory enough to warrant recommendation.—*J. Fred O'Kelly.*

3289. CALVINO, MARIO. **El barajillo, leguminosa forrajera de América Central. [The barajillo, a leguminous forage plant of Central America.]** Rev. Agric. Com. y Trab. [Cuba] **4**: 547–548. *2 pl.* 1921.—Seed of *Meibomia Rensoni* (Paynter) was received from the Republic of San Salvador, where it is indigenous. This plant is well suited to Cuban soil and climate, making an excellent forage plant when not allowed to grow too long. *M. Rensoni* is a wild perennial shrub, of rapid growth, attaining a height of 5–6 m., and commonly found at altitudes of 600–1200 m. above sea level. The plant resists prolonged drought, grows well in the poorest soils, and quickly produces new tops after each cutting. [See also Bot. Absts. 10, Entry 1499.] —*G. R. Hoerner.*

3290. CALVINO, MARIO. **La harina de yuca para hacer pan. [Yuca flour for making bread.]** Rev. Agric. Com. y Trab. [Cuba] 5^3: 4–9. *8 pl.* 1922.—A general review is given of some of the work of the Cuban agronomic experiment station in the introduction and improvement of plants as food for animals and of the attention given to the possibilities of certain food plants for man. Chief among the latter is yuca. An historical review of the status of the use of yuca in countries other than Cuba is given as well as the development of its manufacture and use in Cuba. Details of manufacturing methods of yuca flour and the by-products starch and tapioca are presented. Costs of the various processes and directions for growing the plant are included.—*G. R. Hoerner.*

3291. CALVINO, MARIO. **La luz y la producción vegetal. [Light and plant production.]** Rev. Agric. Com. y Trab. [Cuba] 4: 532–536. *2 pl.* 1921.—A popular discussion of the subject is given especially as it relates to tropical agriculture. Reference is made to, and abstracts are taken from, the works of several authors whose findings relate to tropical plants in general and the situation in Cuba in particular.—*G. R. Hoerner.*

3292. Calvino, Mario. **Los "arrowroots" o "feculas comestibles." [The "arrowroots" or "edible starches."]** Rev. Agric. Com. y Trab. [Cuba] 5^3: 16–17. *3 pl.* 1922.—The "arrow root" of commerce is produced chiefly from *Maranta arundinacea* L. and *Canna edulis* Ker. (*C. esculenta* Lodd., *C. rubricaulis* Link). Both are adapted to Cuba. Cultural data are presented as well as methods of preparing the starch. Recipes are also given.—*G. R. Hoerner.*

3293. Calvino, Mario. **Nuevo sistema de sembrar caña. Sistema "Ferrer." [A new system of planting cane. "Ferrer" system.]** Rev. Agric. Com. y Trab. [Cuba] 5^3: 19–20. *2 pl.* 1922.—Experiments were conducted to compare the new method of planting with the usual one on cultivated lands. The "Ferrer" system has been used on burned-over rough land where cultivation is not possible but has not been tried on tilled land. It consists in placing pieces of cane vertically in the soil and cutting them off at the soil surface. The method prevents the piece from drying out and does away with the necessity of opening and closing a furrow, thus reducing the cost of planting. The upper end of the seed piece is near the soil surface, and germination takes place earlier and in greater percentage, more suckers are formed, and larger clumps of greater height result. The need of resetting seed pieces that have not germinated is avoided. The adoption of this method is regarded as promising of large savings to growers.—*G. R. Hoerner.*

3294. Calvino, Mario. **Una nueva gramínea forrajero para Cuba. [A new forage grass for Cuba.]** Rev. Com. y Trab. [Cuba] 5^1: 4–5. *1 pl.* 1922.—Seed of *Brachiaria brizantha* (Hochst.) Stapf. (*Panicum brizanthum*) was secured from Australia and Belgian Africa and sent to the Cuban Agronomic Experiment Station in 1920. The plant is generally well adapted to Cuban conditions and of value as a forage plant. It merits the attention of stockmen. C. V. Piper reports it as having given satisfactory results at Gainesville and Kicco, Florida, and at McNeil, Mississippi.—*G. R. Hoerner.*

3295. Chang, Tung Wu. **[Selection of Trice cotton.]** Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kan [China Cotton Jour.] 2^4: 229–235. 1921. [Text in Chinese.]—The author relates the origin and type of the plant and describes in detail the latest methods used by American cotton breeders in selection of Trice cotton.—*Chunjen C. Chen.*

3296. Chen, Chunjen C. **[The cotton improvement of the U. S. Department of Agriculture.]** Ko-Hsueh [Science Pub. Chinese Sci. Soc.] 6: 1260–1266. 1921. [Text in Chinese.]—The author reviews various investigations in progress on improvement of cotton by the Bureau of Plant Industry, the Bureau of Markets, and the Federal Horticulture Board.—*Chunjen C. Chen.*

3297. Cremata, Merlino. **Cultivo del boniato. [Cultivation of the sweet potato.]** Rev. Agric. Com. y Trab. [Cuba] 5^1: 26. 1922.—Popular.—*G. R. Hoerner.*

3298. Dawe, M. T. **Efwatakala grass [Melinis minutiflora] as a means for the control of of the tsetse-fly.** Tropic. Life 18: 69–71. 1922.—The writer found this grass in the Congo District of Angola, Africa. It was common in both the low country and on the plateau lands, but most abundant at elevations of 2,000–3,000 feet above sea level. Efwatakala grass is distributed over Africa from south of the Sahara to Natal, and also occurs in Madagascar. It is cultivated extensively in Brazil, where it is known as "Gordura" and "Capim mellado." In Africa it has various native names according to the tribe, but in the interior of the Congo District it is known as Efwatakala grass. Material collected in this region was identified at Kew as *Melinis minutiflora* var. *mutica*. The writer collected in Angola 2 other species, *M. gracilis* and *M. effusa;* the former is a very small grass, but the latter resembles in size *M. minutiflora*. A 4th species found in the Cabinda Enclave is called by the natives "Sala." It is a coarser grass of much ranker growth, the species being as yet undetermined. The writer suggests that, because of the strong odor emitted by Efwatakala grass in connection with the sticky glandular hairs which cover the leaves, it might act as a repellent to the tsetse-fly, ticks, and possibly mosquitoes. The grass is a vigorous grower and thrives on both the uplands and lowlands, besides being palatable to cattle. It makes a splendid pasture grass, therefore, and when once established provides a source of income aside from its possible insecticidal value. The writer urges governmental encouragement for testing his idea in the tsetse-fly infested parts of Africa.—*H. N. Vinall.*

3299. Dorchester, C. S. **A treatment to preserve valuable representative samples of ear corn.** Jour. Amer. Soc. Agron. 14: 93–95. 1922.—Ears of corn dipped in white shellac were preserved much better than those dipped in a half and half solution of shellac and wood alcohol or in antimot as compared with ears not treated. The ears were protected from the Angoumois grain moth, from other insect pests, and from mice.—*F. M. Schertz.*

3300. Dorph-Petersen, K. **Snylteplanten Silke. [The parasite dodder].** Ugeskr. Landmaend 66: 566–567. 1921.—In the regulations of the Danish seed-testing station the allowance of 20 dodder seed per 100 gm. of seed has been diminished to 10 dodder seed, although dodder, as a rule, is of small importance in Denmark. In the last year, when a mild winter was followed by a hot summer, dodder was rather harmful in clover and alfalfa fields, much in the same way as in central and southern Europe.—*Ernst Gram.*

3301. Downing, R. G., and L. G. Little. **Wheat variety trials. Ten years' results (1911–1920) at Glen Innes experiment farm.** Agric. Gaz. New South Wales 33: 241–245. 1922.—Wheat has been a crop of secondary importance in the New England district because of (a) liability to rust, (b) wet summers which prevent production of a good wheat hay, (c) poor quality of flour, and (d) inferiority as a cash crop. The conditions (a) and (c) have been largely overcome by introduction of improved varieties. Clarendon and Early Haynes Blue Stem were the ranking varieties in regard to yield of grain. The latter and Glen Innes No. 2 were highest in the production of hay. Genoa averaged 18 bushels per acre for the 10-year period.—*L. R. Waldron.*

3302. Dunlavy, Henry. **Frequency and importance of five-lock bolls in cotton.** Jour. Amer. Soc. Agron. 13: 332–334. 1921.—Of the bolls of Watson Acala cotton grown at Italy, Texas, 73.38 per cent were 5-lock bolls. The latter were found to be 11.24 per cent heavier than 4-lock bolls, and are considered by the producer to be more valuable.—*F. M. Schertz.*

3303. Earle, F. S. **Sugar-cane varieties of Porto Rico III.** Jour. Dept. Agric. Porto Rico 5: 3–141. 1921.—The present is the last of a series of 3 papers published in this journal on sugar cane varieties in the Island. The 2 former papers were published in Vol. 3, April, 1919, and Vol. 4, July, 1921, respectively. For each important variety the name, synonyms, history, description of appearance, quality, characteristics, and place of cultivation are enumerated.—*C. Rumbold.*

3304. Ferris, E. B. **Report from South Mississippi Branch Experiment Station for 1921.** Mississippi Agric. Exp. Sta. Bull. 201. *20 p.* 1922.—The report gives results of variety tests with corn and cotton; fertilizer tests with corn, cotton, tomatoes, and sweet potatoes; rotations and cover crops, and cultural practices with different fruits at Poplarville in south Mississippi.—*J. Fred O'Kelly.*

3305. Fingerling. **Der gegenwärtige Stand der Einsäuerungsfrage. [The present status of the ensilage question.]** Mitteil. Deutsch. Landw. Ges. 37: 309–314. 1922.—This is a recent address before the "feeds" section of the German Agricultural Society. The speaker set forth the biological principles governing the production of ensilage and described the American silo and its handling; the production of sweet silage ("Süsspressfutter"), and the use of electric current to raise the temperature of the green material to 50°C., as is necessary for the production of sweet silage. By the use of direct current an ensilage was produced from maize that could be fed in much greater quantities than is general, was eagerly eaten, and caused a marked increase in the milk flow. Later, red clover ensilage was prepared by this method and produced perfect feed. The acetic acid content was only 0.2 per cent and that of lactic acid only 0.45 per cent. Two hundred pounds of green matter required 2–2.5 kilowatts of current to raise the temperature to 50°C.—*A. J. Pieters.*

3306. Frank, Franz. **Kartoffelbauversuche in Kärnten im Jahre 1921. [Potato culture experiments in Kärnten in 1921.]** Oesterreich. Zeitschr. Kartoffelbau 2: 5–6. 1922.—The author reports competitive tests with English, German, and local varieties. The highest yielding English and German varieties were among those known to be susceptible to the wart disease.—*F. Weiss.*

3307. Fraps, G. S. **Digestibility of the sugars, starches, pentosans, and protein of some feeding stuffs.** Texas Agric. Exp. Sta. Bull. 290. *21 p.* 1922.—This bulletin deals with the quantity of sugars, starches, pentosans, and residual nitrogen-free extract of the nitrogen-free extract and their digestibility. The quantity of sugars in most feeds is comparatively small, many of them containing less then 3 per cent. The sugars are digested almost completely. The quantity of starch is low in roughages and high in concentrates. The digestibility of the starch is high in all feeds. The sugars, starches, and pentosans account for nearly all of the nitrogen-free extract of many of the concentrates, but for only a small part of the roughages. While the amount of amids is usually small, it may sometimes make up a considerable portion of the protein. The digestibility of the pentosans in the nitrogen-free extract is more variable than that of the starch and is generally lower, varying from 50 to over 60 per cent. The digestibility of the residual nitrogen-free extract was less than 40 per cent with 26 of the samples. It was more than 50 per cent with alfalfa hay, peanut hay, and other legumes.—*L. Pace.*

3308. Fraps, G. S. **Digestion experiments.** Texas Agric. Exp. Sta. Bull. 291. *16 p.* 1922.—The value of stuffs for feeding purposes depends on bulk, palatibility, ash content, suitability to the animal, vitamin content, digestible protein, and productive value.—Tables showing results of tests are given for alfalfa hay, alfalfa meal, delinted cottonseed hulls, and those with lint on, sorghum (red top), corn bran, Darco (sorghum), milo (whole), milo (ground), rolled oats, oats (whole), oat-hull clippings, oatmeal mill by-products, peanut hulls, pinto beans, velvet beans in pods, and various wheat products already reported in a previous bulletin.—*L. Pace.*

3309. Fraps, G. S. **The effect of rock phosphate upon the corn possibility of phosphoric acid of the soil.** Texas Agric. Exp. Sta. Bull. 289. *17 p.* 1922.—Comparisons of Tennessee rock phosphate with Florida soft phosphate and dicalcium phosphate show corn possibilities of about 30, 34, and 52 bushels per acre as compared with 17 bushels with no phosphate. The 13 bushel increase should occur for several years as only 1.4 per cent of the phosphoric acid is removed by each crop.—*L. Pace.*

3310. Freeman, G. F., and R. E. Dickson. **Cotton variety experiments 1912–1920. Substation No. 7, Spur.** Texas Agric. Exp. Sta. Bull. 288. *17 p.* 1922.—This bulletin reports on methods of cotton culture, yields, and varieties grown on the Permian Red-beds region of Texas, lying below the cap-rock of the plains. Attention is called to those varieties giving the best results. As no cotton tested is ideal for this section, work is under way to develop a cotton suited to this region.—*L. Pace.*

3311. Gerlach. **Zur Phosphorsäurefrage. [On the question of phosphoric acid.]** Mitteil. Deutsch. Landw. Ges. 37: 192–195. 1922.—The author brings together the results from a number of experiments to show that before the war phosphoric acid was used in excess and that consequently on most fields there is at present a sufficient supply to warrant reducing the applications and thus save expense. He gives figures showing that the hectare yield of wheat and rye in 1921 was greater than the average of 1909–1913 in spite of the reduced use of artificial fertilizers.—*A. J. Pieters.*

3312. Gilmore, J. W., and L. J. Fletcher. **Desirable qualities of California barley for export.** California Agric. Exp. Sta. Circ. 246. *11 p., 1 fig.* 1922.—The report concerns the methods of threshing barley and the characteristics of good malting barley.—*A. R. C. Haas.*

3313. Grantham, A. E. **Some observations on the behavior of bearded and smooth wheats.** Jour. Amer. Soc. Agron. 14: 57–62. 1922.—Bearded gave a higher yield than smooth wheats. Effects of fertilizers on the bearded and smooth wheats are compared. An average of 285 kernels of bearded wheat and 412 of smooth wheat weighed 10 gm. Excess of nitrogen seemed to affect the smooth more adversely than the bearded wheats.—*F. M. Schertz.*

3314. Hackleman, J. C. **Growing soybeans in Illinois.** Illinois Agric. Exp. Sta. Circ. 255. *16 p., 12 fig.* 1922.—Methods of culture and harvesting soybeans (*Soja max*) are discussed. Recommendations of varieties for different uses in various sections of the state are given.—*O. H. Sears.*

3315. Hansen, F. **Rodfrugtarter i Forhold til Jordbund og Gødskning. [Root crops in relation to soil and fertilization.]** Ugeskr. Landmaend 66: 650–652. *1 fig.* 1921.—Judging from results from 3 experimental fields, it is stated that on unfertilized soil mangolds are the poorest croppers. Poor soil, with a low amount of manuring, are better utilized by swedes and potatoes. For the manure applied mangolds pay better than swedes and potatoes, but heavy fertilizing of all of these crops is not economical.—*Ernst Gram.*

3316. Hansen, H. J. **Erfaringer vedrørende Frøavl af Græsmarksbælgplanter. [Experiments with the production of legume seed for the pasture.]** Nordisk Jordbrugsf. 1921: 90–98. 1921.—Most important is late red clover (*Trifolium pratense serotina*), but seed production has been practiced virtually only since the experiments of the last few years have shown the usefulness of late instead of early red clover, and since the native variety Hersnap has come into prominence. In 1921 the seed area was 400 hectares, but the State used as much seed as could be produced on 900 hectares. Even in a state as small as Denmark the localities are very different; moor and wet acid soils are not favorable, but otherwise both heavy and light soils are used. In order to secure the necessary number of bumblebees the area devoted to clover for seed should not be more than 3–4 hectares, and the fields should lie close to ditches, groves, and other homes of bumblebees. In order to avoid stem-rot (*Sclerotinia Trifoliorum*) and nematodes (*Tylenchus devastatrix*) clover should not be used more than once in an 8-year rotation.—*Ernst Gram.*

3317. Harris, F. S. **Comment on R. S. Vaile's discussion of Utah results.** Jour. Amer. Soc. Agron. 13: 316–317. 1921.—A polemic.—*F. M. Schertz.*

3318. Hartwell, Burt L. **Relative growth response of crops to each fertilizer ingredient and the use of this response in adapting a fertilizer analysis to a crop.** Jour. Amer. Soc. Agron. 13: 353–359. 1921.—In this presidential address a grouping is given of agricultural crops showing their relative response to each of the fertilizer nutrients.—*F. M. Schertz.*

3319. Haunalter, Emil. **Die Gründüngung beim Kartoffelbau. [Use of green manures in potato culture.]** Oesterreich. Zeitschr. Kartoffelbau 2: 13–14. 1922.—Use of leguminous green manure crops particularly of blue lupine, in the rotation preceding potatoes gives excellent results in Austria.—*F. Weiss.*

3320. Helios, Scoetta. **Frumenti di Cirenaica. [The wheats of Cyrenaica.]** Gior. Agric. Domenica 31: 35. *3 fig.* 1921.—Descriptions and notes are given of the 3 best varieties in Cyrenaica, namely, Mogarbia, Misko, and Screisra.—*C. E. Leighty.*

3321. Iosa, G. **Il "Cignarellone" del Molise. [The Cignarellone (wheat) of Molise.]** Italia Agric. 58: 1–5. *4 fig.* 1921.—This variety of wheat, grown in Molise (south-central

Italy) at 600–800 m. elevation, is described. Results of comparative-yield tests, and chemical analysis of the grain are reported. Flour from this wheat is desirable for pastry making.—*C. E. Leighty.*

3322. Ippolito, G. d'. **Sulla fertilizzazione del seme di frumento. [Studies upon the fertilizing of wheat seed.]** Staz. Sper. Agrarie Ital. **54**: 248–255. 1921.—Experiments are related in presoaking of wheat seed in solutions of K_2HPO_4, $CaHPO_4$, Na_2HPO_4, $(NH_4)_2HPO_4$, $Ca(NO_3)_2$, NH_4NO_3, KNO_3, K_2SO_4, $MnSO_4$ (0.05–0.30 parts per 1000) of various concentrations in the hope of investigating the truth of the alleged increases in the yield of seed so treated. Comparative tests showed that all salts except $MnSO_4$ were of no value, and that simple water proved most efficient. $MnSO_4$ was found to produce a considerable increase in the yield of seed of plants arising from treated grain.—*A. Bonazzi.*

3323. Janchen, Erwin. **Einige Beobachtungen an schottischen Kartoffelsorten. [Observations on Scotch potato varieties.]** Oesterreich. Zeitschr. Kartoffelbau **2**: 3–4. 1922.—The English potato varieties introduced into Austria in 1921 to improve domestic seed stocks are described and compared as to value with local varieties. The dry summer proved especially unfavorable to most of them as compared with German and Austrian potatoes, but some of the English wart immune varieties yield as well as the susceptible Up-to-Date, and their further extension in Austria is greatly to be desired. Some of the Irish potatoes were severely affected with Spongospora scab but owing either to unfavorable soil conditions or the dry season this disease was absent in their progeny.—*F. Weiss.*

3324. Jones, J. M., and R. A. Brewer. **Grain sorghums versus corn for fattening lambs.** Texas Agric. Exp. Sta. Bull. 285. *23 p.* 1922.—The object of this 90-day test was to compare the gains and economy of gains made by lambs fattened on the grain sorghums and on corn. Tables show rations used, composition, cost, weather conditions during test, and comparisons of the various combinations of Kafir, feterita, milo, and cottonseed with corn. In this test, as in the previous one, lambs fed on milo made slightly larger average daily gains than those fed on corn. Those fed on Kafir gained more than those fed on milo. Those fed on milo, cottonseed and alfalfa hay made the largest gains.—*L. Pace.*

3325. Joyce, T. A. **Yerba Maté. Light on old records from Sir Herbert Gibson.** Pan Amer. Mag. **34**: 27–28. 1922.—The article contains brief historical data relative to the discovery and first use of maté. This information was communicated by letter from Sir Herbert Gibson to the author upon the publication of his monograph on maté [Pan Amer. Mag. **33**: 307–328. 1921].—*M. R. Burr.*

3326. Karper, R. E. **The blueweed and its eradication.** Texas Agric. Exp. Sta. Bull. 292. *18 p.* 1922.—The blueweed (*Helianthus ciliaris*), a perennial with horizontal underground root stalks, is regarded as the worst weed pest in west Texas. It is also found in western Oklahoma, New Mexico, and Arizona. It barely survives in pastures but when these are plowed it at once grows vigorously. The seed are of low vitality, only 20 out of 1950 germinating, 1 of these after 109 days. Experiments in eradication by various methods are reported.—*L. Pace.*

3327. Kirpatrick, Roy T. **The approved seed plan of the Missouri Corn Growers' Association.** Jour. Amer. Soc. Agron. **13**: 330–332. 1921.—The plan is given and discussed.—*F. M. Schertz.*

3328. Lang, Emil. **Der Ertragsverlauf in der Landwirtschaft bei steigendem Aufwand. [The course of returns in agriculture with increasing expenditures.]** Landw. Jahrb. **55**: 337–407. 1920.

3329. Leipziger. **Deutschlands Bedarf an Klee und Grassaaten im Hinblick auf die eigene Erzeugung und die Ein- und Ausfuhr. [Germany's requirements in clover and grass

seed with reference to domestic production and imports and exports.] Mitteil. Deutsch. Landw. Ges. 37: 299–300. 1922.—After pointing out the unsatisfactory state of statistics and the difficulties of arriving at accuracy, the author gives 2 tables. In these he estimates the requirements, domestic production, and quantities available for export or needed for import of clovers, alfalfa and similar crops, and the principal grasses. With the exception of alfalfa and sweet clover (only insignificant quantities of the latter being used) Germany has a surplus of leguminous seed for export. Some of all grasses (except *Dactylis glomerata* and *Festuca ovina*) must be imported.—*A. J. Pieters.*

3330. Levy, E. Bruce. **The grasslands of New Zealand.** New Zealand Jour. Agric. **23:** 321–330. *10 fig.* 1921.—The principles of pasture establishment are given.—*N. J. Giddings.*

3331. Levy, E. Bruce. **The grasslands of New Zealand.** New Zealand Jour. Agric. **24:** 8–14. *6 fig.* 1922.—The author recommends a grass mixture for swamp lands not subject to flooding. The sweet floating grass (*Glyceria fluitans*) has been found very desirable on lands which are sometimes under water.—*N. J. Giddings.*

3332. Lier, O. **En redegørelse vedrørende frøavl av engbelgvekster i Norge. [An account of the production in Norway of seed of pasture legumes.]** Nordisk Jordbrugsf. **1921:** 85–89. 1921.—Of the late red clover (*Trifolium pratense serotina*) a good deal is produced locally on lots set apart from the 2nd year pasture or, if sufficiently uniform and free of weeds, from the 1st year pasture, which yields more and better seed. A few growers have in later years layed out pure clover for seed, producing very prominent local varieties for sale. Alsike (*T. hybridum*) is as extensively produced as red clover and in mixture with this. About 10 per cent of the annual requirement of clover seed is imported.—*Ernst Gram.*

3333. Luhning. **Zeitgemässe Fütterungslehre. [Timely feeding doctrine.]** Mitteil. Deutsch. Landw. Ges. **37:** 297–298. 1922.—It is shown that the cattle breeder can not succeed without abundant and good pastures properly seeded to grasses and clovers.—*A. J. Pieters.*

3334. McDonald, A. H. E. **The production and breeding of wheat.** Agric. Gaz. New South Wales **33:** 305–309. 1922.—Emphasis is placed on the proper choice of varieties and the importance of summer fallowing in New South Wales where rainfall is less than 15 inches during the growing period. Use of a proper rotation is urged.—General principles of breeding are discussed insofar as they relate to the production of new wheat varieties.—*L. R. Waldron.*

3335. McGowan, H. E. **Commercial potato growing.** New Zealand Jour. Agric. **23:** 336–340. *3 fig.* 1921.—Digging, grading, storing, and marketing of potatoes are discussed.—*N. J. Giddings.*

3336. McMahon, Thos. J. **The sugar industry of the Crown Colony of Fiji.** Internat. Sugar Jour. **24:** 240–243. 1922.—An account is given of the political and economic life of this British colony, which has been growing rapidly since the building of the Panama Canal. The country is well suited to sugar cane culture, averaging 30 tons of cane to the acre and on river lands often 60 tons. Sugar cane grows wild in Fiji. One variety, called "Dovu" by the Fijians, is used as food; another called "Vico" has little value. Neither has been cultivated. The cultivated canes are Badila, Malabar, Rose Bamboo, and Striped Singapore.—*C. Rumbold.*

3337. Magnus, Hans. **Theorie und Praxis der Strohaufschliessung. [Theory and practice of processing straw.]** *43 p.* Paul Parey: Berlin, 1919.—The author briefly refers to some of the earlier efforts at processing straw and states that in 1 month of 1918 a total of 10,000 tons of straw was processed in various ways. Kelner is quoted to the effect that 100 kgm. crude straw has 11 kgm. starch value whereas concentrated straw has 45–50. G. Fingerling claims that well processed straw has 70 per cent starch value. On the basis of a 55 per cent yield in weight and a 60 per cent starch value 100 kgm. of crude straw when processed will have 33 kgm. starch value against 11 kgm. in the crude straw.—The most recent and best method is the Beckmann patented process. To fine cut straw is added 8 times the amount of a 1½ per cent caustic soda solution. After standing 4 hours the pickle is poured off and the processed straw washed to remove the traces of alkali. The pickle then contains about ½ the original NaOH and can be used again by adding fresh 6 per cent NaOH. This can be done not to exceed 3 times because the pickle becomes so saturated with dissolved lignin material that it is inactive. In this way, 24 per cent NaOH serves three charges at 12 per cent strength, a net consumption of 8 per cent NaOH for each charge. The theoretical considerations governing the processing of straw are developed in detail. Briefly the object is to treat the straw enough to remove as much lignin as possible while keeping the loss of digestible organic substances as low as possible. Processing under high temperatures affects the digestible organic substances more than it does the lignin; consequently the cold process is preferred. Figures are given showing the results in yield and loss of lignin, cellulose, etc., when straw is processed by various methods. Soda or CaO, both in 8 or 10 per cent solutions and boiled without pressure 3–5 hours, can be used with results nearly as good as those secured by the Beckmann method with NaOH. Processing straw with soda without heat or at a moderate temperature failed, while boiling under pressure was too destructive of digestible organic matter. Boiling cut straw with 8 per cent soda for 3 hours without pressure gave a yield of 74 per cent as against 73 by the Beckmann cold process and caused a loss of 13.29 per cent of the digestible organic materials as against a loss of 12.1 per cent by the Beckmann process. The great advantage of the soda process lies in the fact that "soda" (carbonate of soda) can be shipped in sacks while caustic soda must be shipped in iron containers. The caustic soda is also more dangerous to handle. No figures are given showing the cost of these processes in material and labor.—*A. J. Pieters.*

3338. Mahood, John A. **Pastures and dairy industry in Florida.** Florida Agric. Dept. Quart. Bull. **32**: 81–88. 1922.—Popular.—*J. C. Th. Uphof.*

3339. Makin, R. N. **Fodder crops for dairy farmers. Southern tableland.** Agric. Gaz. New South Wales **33**: 317–319. 1922.—More attention should be given to fodder crops and pastures. Irregular precipitation renders yields of fodder crops uncertain unless preceded by summer or winter fallow. Oats make an excellent fodder crop and certain barley varieties are good. Japanese millet is of greatest value as a catch crop. More alfalfa should be grown. Red clover can be grown on soils too heavy for alfalfa. A sowing table is given.—*L. R. Waldron.*

3340. Maurin, E. **Augmentation de l'isosulfocyanate d'allyle (sénévol allylique) dans la moutarde noire par l'action fertilisante du soufre. [Increase of allylisosulphocyanate (allyl senevol) in black mustard by the fertilizing action of sulphur.]** Bull. Sci. Pharm. **24**: 76–78. 1922.—The addition of sulphur to the soil increases not only the quantity of mustard seed but also the amount of mustard oil; thus the seed from plants grown under ordinary conditions yielded 0.9 per cent of mustard oil, whereas the seed from plants grown in soil to which sulphur had been added yielded 1.0 per cent of oil.—*H. Engelhardt.*

3341. Meloy, G. S. **Meade cotton, an upland long-staple variety replacing Sea Island.** U. S. Dept. Agric. Bull. 1030. *24 p., 11 pl.* 1922.—The large growth and late maturity of Sea Island cotton renders this species susceptible to a great deal of injury by the boll weevil. During the last 10 years the annual production has decreased from 90,000 to 2,000 bales. The destruction of the Sea Island cotton industry was anticipated before the weevil reached the southeastern part of the U. S. A., and steps by the U. S. Department of Agriculture were taken to develop an early small-growing type. After efforts to develop an earlier strain of Sea Island failed, Meade, an upland variety, was brought under experiment. The Meade variety has plant characteristics of the upland type, but the fiber and nakedness of the seed are characteristic of the Sea Island. The staple of the Meade in all practical respects is equivalent and of equal value to the Sea Island staple. The advantage the former has is in the early fruiting habit and small vegetative growth. The Meade variety is not the result of hybridization but has been developed by selection, originally made by Roland Meade in 1921 at Clarksville, Texas, from a local variety known as Black Rattler. Progress has been made in developing this Sea Island substitute, but insect pollination from other varieties and the mechanical mixing of seed at public gins are the chief causes for the occurrence of inferior and off-type plants. The rogueing out of undesirable plants and selection must be continued in order to get the best uniform type of lint and the necessary early fruiting habits for boll weevil conditions.—*J. O. Ware.*

3342. Meyer, L. **Einige Erfahrungen mit Gründüngung im östlichen Deutschland. [Some experiences with green manuring in eastern Germany.]** Mitteil. Deutsch. Landw. Ges. **37**: 422–424. 1922.—The author presents a general record of personal experiences on a stiff clay soil. He describes his use of red and alsike clover, lupines, medic, and serradella.—*A. J. Pieters.*

3343. Milligan, S. **Proceedings of the Board of Agriculture in India.** *135 p., 1 pl.* Government Press: Calcutta, 1922.—This is a report of the proceedings of the 12th meeting of the Board of Agriculture, held at Pusa, February, 1922. It contains an address by the President, S. Milligan, Agricultural Adviser to the Government of India, and discussions and resolutions on the following subjects: Progress of agricultural education in middle schools; the line of demarcation between agriculture and industry; the proposal to prohibit export of certain manures from India; measures to be adopted to secure continuity in permanent field experiments; measures for famine relief; manufacture of nitrogen-fixation products in India; cattle breeding and related problems; motor traction cultivation; need for the study of the problem of nitrates in the soil; and improvement of the potato (*Solanum tuberosum*) crop. Opinions of various officials on the above topics are given in appendices.—*Winfield Dudgeon.*

3344. Milligan, S. **Review of agricultural operations in India, 1920–21.** *120 p., 3 pl.* Government Press: Calcutta, 1922.—This non-technical summary of the progress of Indian agriculture includes: Economic work on important crop plants; investigations on soils, fertilizers, sugarcane, and crop diseases; agricultural engineering; agricultural education; the cooperative movement as affecting agriculture; live stock; and expenditure of the various agricultural departments. Appendices give: Areas under new and improved varieties of crops in 1920–21; list of agricultural stations in British India; list of agricultural colleges and schools; operations of non-credit agricultural cooperative societies; and a list of 136 publications on agricultural subjects in India during the year under review.—*Winfield Dudgeon.*

3345. Mitscherlich, E. A. **Zur Überwindung des v. Liebigschen Gesetzes vom Minimum. [Overcoming Liebig's law of the minimum.]** Landw. Versuchssta. **97**: 23–26. 1920.—This is in reply to an article by Adolf Mayer [Ibid. **96**: 247–250. 1919].—It is pointed out that to determine the influence of any factor either in a physical problem or in plant growth it is necessary to maintain the other factors constant. If all but 1 factor influencing plant growth are constant and this 1 factor varied, the change in yield from the maximum yield is due to the change in this factor. Expressed by an equation it is, $\frac{dx}{dy} = (A-y).C$, where y is the increase in yield above the high yield A, which varies in proportion to the change in the growth factor X. C is the proportionality factor. This equation indicates nothing more for 1 factor, which is proportional to the minimum, than it does for all growth factors in the same way, and is therefore in contrast to the "law of minimum" of Liebig. Integrated the formula is, Log $(A-y) = \log A-cx$, or $y = A\ (1-e^{-cx})$, and finally, $y = E\ (1-e^{-cx}).(1-e^{-c_1x}).(1-e^{-c_2x_2})$. etc., which is of general application.—*R. O. E. Davis.*

3346. Mooers, C. A. **The agronomic placement of varieties.** Jour. Amer. Soc. Agron. **13**: 337–352. 1921.—In this presidential address certain improvements are suggested for increasing the scientific accuracy of varietal trials.—*F. M. Schertz.*

3347. Morada, Emilio K. **Comparative tests of thirty-two varieties of corn.** Philippine Agric. 9: 209–217. 1921.—These tests were made at Los Baños, Philippine Islands, and included observations of size, shape, and position of ears, length of growing season, size of plants, percentage of sterile plants, yields during dry and rainy seasons, and shelling percentage.—*Sam F. Trelease.*

3348. Morris, G. W. **The F. A. Q. wheat. Four years' samples compared.** Agric. Gaz. New South Wales 33: 311–313. 1922.—Samples of wheat from the Grain Trade Section, Sydney Chamber of Commerce, used in fixing standards for shippers and merchants, were milled and graded and comparisons made for the 4 years. Chemical analyses are presented. A slight deterioration in quality is noticed for the past 2 years.—*L. R. Waldron.*

3349. Nolte, O. **Die Wirkung steigender Kaligaben. [The action of increasing amounts of potash.]** Mitteil. Deutsch. Landw. Ges. 37: 424–428. 1922.—The author makes a plea for the increased use of potash. The tables give details of fertilizers, yields, profits, and phosphoric acid content of the crop for rye, winter wheat, winter barley, summer wheat, summer barley, oats, *Vicia faba*, peas, sugar and cattle beets, and potatoes. In a few cases only was there a money loss from the use of 200–300 kgm. per hectare of potash. In most cases the crops fertilized with potash contained more phosphoric acid than those not so fertilized.—*A. J. Pieters.*

3350. Parr, A. E. **Report of the agricultural stations of the Western Circle, United Provinces of Agra and Oudh (India), for the year ending 31st May, 1921.** *85 p.* Government Press: Allahabad, 1921.—This report covers the work of 9 government experimental farms. The main work is the testing of varieties, and of methods of cultivation of cotton (*Gossypium* spp.), wheat (*Triticum vulgare*), sugar cane (*Saccharum officinarum*), and other crop plants important in the western part of the United Provinces. Details are given for the various experiments.—*Pluchea lanceolata*, a common and troublesome weed, growing 1.5–2 feet high, with roots extending straight downward 22–25 feet, damages low crops by shading them. Grazing cattle will not eat it, and cultivators regard it as harmful to cattle. The experiment was tried of using it for fodder. Bullocks fed on a ration of half ordinary fodder and half *Pluchea* came to show a distinct preference for it, and gained more weight and looked better than those fed entirely on ordinary fodder.—*Winfield Dudgeon.*

3351. Perret, Cl. **La dégénérescence des pommes de terre. [Degeneration of Irish potato.]** Bull. Soc. Path. Vég. France 9: 39–41. 1922.—The foreign varieties introduced at Merle in central France suffered much from the spring drought of 1921. In certain localities of the Monts du Farez a domestic variety, the Violette, cultivated for 50 years without renewal and without selection has not degenerated.—*J. Dufrenoy.*

3352. Pitt, J. M. **Farmers' experiment plots.** Agric. Gaz. New South Wales 33: 260–264. 1922.—Mangels were under trial in the Mt. George region and garden peas in the Manning River district. Heavy rains and rich soils accounted for yields of mangels of nearly 50 tons per acre. The outstanding variety of peas was Greenfeast.—*L. R. Waldron.*

3353. Powers, W. L., and W. W. Johnston. **Irrigation of alfalfa.** Oregon Agric. Exp. Sta. Bull. 189. *36 p., 24 fig.* 1922.—Alfalfa is the leading irrigated crop. Directions are given as to the best method of irrigation, time, frequency, and amount of application. Data are given on duty-of-water experiments, and on maximum yields and maximum net profits with varying amounts of water.—*C. E. Owens.*

3354. Pridham, J. T. **Pryor barley.** Agric. Gaz. New South Wales 33: 238. 1922.—This early variety of barley probably came originally (unnamed) from Chili. It resembles a cross grown in New South Wales which originated from Kinver × *Hordeum spontaneum*. Pryor is suited to the warmer districts of New South Wales.—*L. R. Waldron.*

3355. Reitmair, Otto. **Die Verwendung von Kunstdüngern im Kartoffelbau. [The use of artificial fertilizers in potato culture.]** Oesterreich. Zeitschr. Kartoffelbau **2**: 9–10. 1922.—Requirements of Austria's soils for potato culture are discussed from the standpoint of the fertilizer materials now available and the market prices thereof.—*F. Weiss.*

3356. Reynolds, Mark H. **Fodder crops for dairy farmers. Northwestern districts.** Agric. Gaz. New South Wales **33**: 319–321. 1922.—The main problem is to provide succulent fodders for the season when natural pastures are dry. The most important crop is alfalfa. Sudan grass and sorghum do very well and can be recommended. If maize is used it should be sown early, either thinly broadcasted or in drills. Sowing of cereals in March can be advised. Rape, mustard, and root crops are advisable under certain conditions. A table giving best dates of sowing and other information is appended.—*L. R. Waldron.*

3357. Rivera, Vincenzo. **Sopra le condizioni di sviluppo di alcuni semi di leguminose e la funzione del guscio. [Studies on the conditions of germination of some legume seeds and on the function of the pod.]** Mem. R. Staz. Patol. Veg. Roma [1922:] 3–12. 1922.—A copy of this paper is to be found in Rivista di Biologia 4^1: 1922. Studies are related upon the absorption of water by naked seed of *Onobrychis sativa* and by seed still in the pod. The loss of water from these 2 types of seed, after having been in the moist chamber, is also studied. It is found that the pod acts as a strong water absorbent from the soil, so that the seed in the seed-chamber is evenly moistened and is protected against too rapid and protracted changes in the moisture content of the environment. The protection is not limited to the pre-germinative period but extends also to the post-germinative period, when the young succulent organs are easily injured by lack of moisture. The conclusion is reached that in practice the seed of *Onobrychis* should not be removed from the pod before seeding.—*A. Bonazzi.*

3358. Rojales, Pedro S. **Distribution of abaca in Cavite Province as related to soil and climate.** Philippine Agric. **9**: 219–232. 1921.—The abacá (Manila hemp) growing section of Cavite Province (Philippine Islands) is sloping, and success of cultivation varies with altitude and exposure. The study includes observations on rainfall, temperature, typhoons, and soil conditions.—*Sam F. Trelease.*

3359. Rothea. **Étude de quelques produits alimentaires du Pérou (Lima). [Investigation of some food products of Peru (Lima).]** Bull. Sci. Pharm. **24**: 134–138. *Fig. 7.* 1922.—An account is given of a microscopical and chemical examination of 2 samples of potatoes, chino blanco and chino negro, dried in the cold, samples of quinoa (*Chenopodium quinoa*), occa (*Oxalis tuberosa*), and corn. It was found that the potato known as chino blanco was more valuable as a nutrient than chino negro. The seed of *Chenopodium quinoa* is rich in nitrogenous and amylaceous substances, and is an excellent nutrient. The plant is grown together with potatoes on the higher plateaus where corn cannot be cultivated. Occa, a rhizome, is rich in nitrogenous substances, sugars, and starch. The starch grains have a characteristic shape.—*H. Engelhardt.*

3360. Rothgeb, Benton E. **Cultural experiments with grain sorghums in the Texas Panhandle.** U. S. Dept. Agric. Bull. 976. *43 p., 11 fig.* 1922.—Date-of-seeding, rate-of-seeding, and environmental experiments during the period from 1914 to 1919 are reported, previous work having been presented in U. S. Dept. Agric. Bull. 698. On account of varying seasonal conditions no one date of seeding is best for all years, although the average yield over a series of years is a safe basis upon which to work. Dwarf Milo gave best average yields when seeded about May 23, Dawn kafir when seeded early, May 10, and Manchu Kaoliang when seeded late, about June 10. However, all varieties did not give highest average yield from the same date of seeding. Dwarf Milo has proved to be the best variety in this section. Grain crops spaced 3½ feet apart will produce a higher average total crop yield, but spacing 7 feet apart is a surer way of securing a crop. Source of seed had practically no effect on growth and its effect on composition of the crop was far less than the effect of soil and climate and other environmental conditions.—*Ward H. Sacks.*

3361. Schmoeger, Max. **Felddüngungsversuche ausgeführt auf Veranlassung der Dünger-Abteilung der D. L. G. in den Jahren 1903 bis 1917 von der Landwirtschaftlichen Versuchstation Danzig. [Field fertilizer experiments carried out at the suggestion of the fertilizer section of the German Agricultural Society in the years 1903–1917 by the agricultural experiment station at Danzig.]** Arbeit. Deutsch. Landw. Ges. 304. *103 p.* 1920.—A critical report is made on fertilizer experiments on potatoes, oats, sugarbeets, wheat, rye, clover and grass, and barley.—*A. J. Pieters.*

3362. Schneidewind. **Versuche über das Phosphorsäuredüngebedürfniss der Böden. [Investigations on the phosphoric acid requirements of soils.]** Mitteil. Deutsch. Landw. Ges. 37: 56–57. 1922.—A 1-season test on soils previously heavily manured showed that the addition of phosphoric acid had no effect or only a very slight one.—*A. J. Pieters.*

3363. Schubert, Josef S. **Etwas über Sortenwahl und Sortenwechsel im Kartoffelbau. [Concerning selection and exchange of varieties in potato culture.]** Oesterreich. Zeitschr. Kartoffelbau 2: 1–3. 1922.—The author discusses distribution of potato culture in Austria from the standpoint of soil types, yield, and varieties grown. He classifies varieties with respect to resistance to blight, scab, and wart diseases.—*F. Weiss.*

3364. Schurig. **Wie wird durch Gründüngung und tiefe Bodenbearbeitung der Wasservorrat des Bodens und somit der Ertrag beeinflusst? [How is the water supply of the soil and consequently the yield effected by green manuring and deep working of the soil?]** Mitteil. Deutsch. Landw. Ges. 37: 189–192. 1922.—The author points out the dependence of plant growth upon water and the importance of conserving it since fertilizers can only give good results in the presence of an abundant supply. He shows how this may be done by cultural methods. On heavy soils green manuring must be practised with discretion since in dry seasons the green manure crop may so exhaust the reserve water supply as to decrease the next crop.—*A. J. Pieters.*

3365. Scofield, C. S., T. H. Kearney, C. J. Brand, O. F. Cook, and W. T. Swingle. **Production of American Egyptian cotton.** U. S. Dept. Agric. Bull. 742. *30 p.* 1919.—The authors describe the development of the American Egyptian cotton industry in Arizona through cooperation between members of the Bureaus of Plant Industry and Markets, constituting the "Committee on Southwestern Cotton Culture" of the U. S. Department of Agriculture, and associations of cotton growers in the Salt River valley. The topics treated are: characteristics and uses of the Egyptian type of cotton, production in Egypt and America, earlier experiments in the U. S. A., breeding work which led to the development of new varieties in Arizona, cooperative organization of growers, labor supply, ginning, grading and marketing the crop, maintenance of pure planting seed, agricultural relationships of crop, cultural methods, insect enemies, and diseases.—*T. H. Kearney.*

3366. Shepherd, A. N. **Farmers' experiment plots. Hay trials on Murrumbidgee irrigation areas.** Agric. Gaz. New South Wales 33: 247–249. 1922.—If early seeding is practiced upon moist soils, 1 irrigation is usually sufficient. Trials were made using both wheat and oats as hay producers. With wheat, Improved Steinwedel, Gresley, and Canberra varieties gave highest yields of hay. Among oats, Algerian ranked highest in hay yield.—*L. R. Waldron.*

3367. Sievers, H. F., and J. H. Shrader. **The preparation of an edible oil from crude corn oil.** U. S. Dept. Agric. Bull. 1010. *25 p., 7 fig.* 1922.—This bulletin reports results of experiments designed to show the most satisfactory and economical methods of preparing an edible oil from crude corn oil. It also considers the economic aspects of the processes now employed, together with the modifications proposed, and includes a detailed plan of an equipment for a commercial refining plant capable of handling 2 batches of 25,000 pounds of oil a week. The cost of refining corn oil in such a plant is said to be approximately 1.6 cents a pound.—*J. W. Read.*

3368. Skerrett, R. G. **America's domestic food supply.** Sci. Amer. 126: 6–7. 1922.—An inventory is given of the needs and the facilities for producing food to supply them.—*Chas. H. Otis.*

3369. Sparks, G. C., and A. N. Shepherd. **Farmers' experiment plots. Wheat experiments.** Agric. Gaz. New South Wales 33: 229–237. 1922.—In the Southern district experiments were conducted upon 18 private farms. Weather conditions were only fairly favorable. The maximum yield of 38.5 bushels was secured from Bomen wheat. Canberra wheat gave excellent results, as usual, but yields from Federation were comparatively low. All manured plots gave satisfactory increases of yield as against no manure. Yields secured near Murrumbidgee under dry-land conditions showed the possibility of successful wheat cropping during the more favorable years.—*L. R. Waldron.*

3370. Spillman, W. J. **A plan for the conduct of fertilizer experiments.** Jour. Amer. Soc. Agron. 13: 304–309. 1921.—The author proposes a plan whereby direct comparisons are possible and illustrates the plan by 3 series, using nitrogen, phosphorus, and potassium fertilizers.—*F. M. Schertz.*

3371. Stewart, George. **Varietal nomenclature of oats and wheat.** Jour. Amer. Soc. Agron. 13: 318–323. 1921.—Numbers when used as part of the name of a commercial variety are awkward, and dangerous as far as accuracy is concerned. Long names should be avoided either by using one part of the name or compounding a part of one of the name words with a part of the other.—*F. M. Schertz.*

3372. Tacke. **Über Torfstreu und den Wert des Torfstreudüngers. [Regarding turf litter and the value of turf litter manure.]** Mitteil. Deutsch. Landw. Ges. 37^2: Flugblatt 20. 1922.—A general discussion is presented.—*A. J. Pieters.*

3373. Tacke, Br. **Mitteilungen über die Arbeiten der Marschkulturkommission. [Contributions concerning the work of the moor culture commission.]** Landw. Jahrb. Ergänzungsband 54^1: *346 p.* 1920.—The author reports investigations carried out under the direction of the commission, including reports on fertilizers, drainage, rotations, meadows and permanent pastures, and other agronomic subjects.—*A. J. Pieters.*

3374. Townsend, C. O. **Climate and sugar beets.** Facts about Sugar 14: 394–395. 1922.—Success in sugar beet growing depends upon the climatic conditions, temperature, moisture, light, and wind. A high percentage of sugar will not be stored in the roots unless there is a marked difference between the day and night temperatures. Beets require considerable moisture but too much results in a second growth with low sugar content. Strong winds are often injurious. In a new locality, sugar beets should be tested for a number of years before trying them on a large scale.—*C. W. Edgerton.*

3375. Vaile, R. S. **The interpretation of water-requirement data.** Jour. Amer. Soc. Agron. 13: 311–316. 1921.—The principle is supported that the acre inch of water should be used as a unit in measuring water economy.—*F. M. Schertz.*

3376. Wenholz, H. **Summer leguminous crops. Cowpeas, soybeans, and velvet beans.** Agric. Gaz. New South Wales 33: 323–331. 1922.—These annual leguminous crops are especially valuable as they tolerate more or less acid soil conditions. Aside from the general role of soil improvers, cowpeas are particularly valuable as a hay crop, soy beans as a grain crop for pigs, particularly for hogging down, and velvet beans are useful as a catch crop for winter grazing. Each crop is discussed in some detail relative to varieties, methods of culture, and utilization.—*L. R. Waldron.*

3377. Wiggans, R. G. **Home-grown and imported red clover seed.** Jour. Amer. Soc. Agron. 13: 334–335. 1921.—Plots from Italian, French, and Michigan grown clover seeds were compared as to winterkilling and yield per plot. Native grown (Michigan) clover was found to be superior.—*F. M. Schertz.*

3378. Wiggans, Roy Glen. **A classification of the cultivated varieties of barley.** Cornell Agric. Exp. Sta. Mem. 46. *365–456. 5 pl., 21 fig.* 1921.—The paper presents a summary of the previous classifications of barley and a discussion of the gross morphological features of barley. In attempting to classify the cultivated barleys, 627 named representatives were obtained from various sources and grown through a period of 5 years. The classification is based on morphological characters. Sixty varieties have been distinguished in the 4 cultivated species; 3 in *Hordeum intermedium*, 20 in *H. distichon*, 29 in *H. vulgare*, and 8 in *H. deficiens*. No consideration was given to yield and, undoubtedly, there are strains within the variety which differ as regards yield.—*L. Knudson.*

3379. Williams, C. B. **Report of the division of agronomy.** Ann. Rept. North Carolina Agric. Exp. Sta. **42:** 17–38. 1921.—A statement is given covering results of fertilizer experiments at the several test farms together with results of seed selection in the improvement of corn, cotton, wheat, and rye.—*F. A. Wolf.*

3380. Williams, D. W., and O. E. McConnel. **Rice bran for fattening hogs.** Texas Agric. Exp. Sta. Bull. 286. *15 p.* 1922.—The test shows that rice bran can be fed safely with equal parts of corn chops and 10 per cent tankage, and in all probability can be fed in as high a proportion as 60 per cent without resulting in carcasses graded soft.—*L. Pace.*

3381. Witte, H. **Froödlingen av vallbäljväkster i Sverige och några erfarenheter och iagttagelser beträffande densamma. [Production of legume seeds in Sweden and some experiences connected therewith.]** Nordisk Jordbrugsf. **1921:** 71–84. 1921.—Sweden needs annually 11,000,000 kgm. of seed for pasture, 40–50 per cent of which are estimated to be clover and other legume seed. Of red clover (*Trifolium pratense*) all seed needed of the late variety is grown in the state, but the production is rather varying, *e.g.*, when heavy rains inhibit the pollination by bumblebees. If conditions are not particularly favorable a dense stand is also apt to decrease the seed output. When drilled in rows the crop is more easily kept free from weeds, but it also seems to be more susceptible to the attacks of clover stem-rot (*Sclerotinia Trifoliorum*) when compared with the fields sown broadcast. When drilled in rows 30 cm. apart the output has been a little higher than when broadcast, but hardly enough to pay for the work. It has been advised to mow the fields in spring in order to produce a more uniform seed crop, but in most cases this has proved a failure. The effect of top dressing with potassium and phosphate is undecided. The harvest should be made when the heads are wilted but the stalks still green. The colour of the seed is not only influenced by time of harvesting but is also a variety character and good types may be bred from yellow and violet seed as well. Alsike clover (*Trifolium hybridum*) is grown for seed in most parts of the state, mainly for home use.—*Ernst Gram.*

3382. Wittmack, L. **Ringelkletten in deutschen Wollen. [Burs in German wools.]** Mitteil. Deutsch. Landw. Ges. **37:** 282–285. 1922.—The author describes the occurrance of fruits of *Xanthium spinosum* and *Medicago* species mostly in wool of foreign origin. It appears, however, that since the war, and especially in 1921, considerable quantities of seed of *Medicago minima* have been cleaned out of German wool, particularly that coming from Pommerania. A detailed description of this species is given together with suggestions for preventing the occurrence of the fruits in the wool.—*A. J. Pieters.*

3383. Wuthrich, E. **The sugar industry in Natal and Zululand.** Internat. Sugar Jour. **24:** 243–247. 1922.—Sugar cane is cultivated along the coast of Natal and Zululand for more than 240 miles, 80 miles south of Durban, and 160 miles north of the city.—The rainfall of Natal averages 40 inches,—minimum 26, maximum 71. The maximum shade temperature is 116°F., the minimum 33. The crushing season in Natal and Zululand extends from May to the end of January.—As a rule the whole stick is planted. Two sticks of cane are thrown side by side in a furrow and cut into short pieces. These are then covered to a depth of 4 inches by hoeing. Weeding between plants is done by hand, between furrows by a pony-plow and scarifier.—In Zululand the cane is burnt before being cut; in Natal this method is not followed. Ratooning is repeated, sometimes 7 times and more. Practically only one variety of cane is cultivated, the *Uba*, the origin of which is almost certainly Poona, India. It is a strong, drought-resisting, deep-rooting cane. Both plants and ratoons of Uba cane mature in Natal in 16–24 months. In parts of Zululand the plant cane matures in the "flats" in 14 to 18 months, ratoons in 12–16 months.—Insufficient care is given to the selection of seed cane. In one district of Natal the yellow stripe disease exists to an extent probably not exceeded elsewhere in the world. In another part are found the red, smut, and vascular diseases.—While it is impossible to give average figures, the minimum and maximum yields for Natal are about 10 and 40 tons per acre. In Zululand on the "flats" near the rivers, yields as high as 50 tons have been obtained.—*C. Rumbold.*

3384. Yeh, Yuen Ting. **[Meade.]** Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kan [China Cotton Jour.] 2^3: 199–206. 1921. [Text in Chinese.].—The author reviews the history and origin of Meade cotton; describes its characteristics; gives statistics on production; compares it with the Sea Island cotton; and discusses the possibilities of growing Trice in China.—*Chunjen C. Chen.*

3385. Yeh, Yuen Ting. **[Problems of growing cotton crop.]** Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kan [China Cotton Jour.] 2^4: 236–241. 1921. [Text in Chinese].—Soils, fertilizers, and planting methods are discussed.—*Chunjen C. Chen.*

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

C. W. Dodge, *Editor*

(See also in this issue Entries 3291, 3325, 3344, 3435, 3520, 3524, 3553, 3593, 3651, 3652, 3666, 3680, 3719, 3723, 3731, 3732, 3764, 3767, 3876, 3946, 3951, 3963, 4199, 4240, 4253, 4352, 4396, 4396, 4437, 4543, 4547, 4567, 4592, 4602, 4613, 4619, 4683, 4704)

3386. Anonymous. **Additions to the library.** Jour. Arnold Arboretum 3: 58–59. 1921 [1922]. —An account of a copy of the 1st edition (1485) of the very rare Herbarius zu Teutsch is given. Another work recently added to the library is Collections de Cent Espèces ou Variétées du Genre Camellia Peintes d'après Nature . . . par Mlle. G. Fontaine, Bruxelles, 1845. This also is apparently very rare, as it is not mentioned in any of the bibliographies consulted.—*Alfred Rehder.*

3387. Anonymous. **Autobiography of the late Prof. John Macoun.** Canadian Field Nat. **36**: 39–40. 1922.—An autobiography of the late John Macoun will be published as a memorial volume by the Ottawa Field Naturalists' Club of Canada.—*W. H. Emig.*

3388. Anonymous. **Das Ende der deutschen höheren Forstlehranstalt in Mähr-Weisskirchen. [The end of the German forest school at Weisskirchen in Moravia.]** Wiener Allg. Forst u. Jagd Zeitg. 39: 206. 1920.—Announcement is made of the closing of the forest school on July 11–14, 1921, on account of the impossibility of securing adequate financial aid. The school had been in existence for 69 years.—*F. S. Baker.*

3389. Anonymous. **Giacomo Giamician.** Gazz. Chim. Ital. 52^1: 1–2. 1922.—The death of this investigator is announced.—*A. Bonazzi.*

3390. Anonymous. **The Crop Protection Institute—its organization and purpose.** Crop Protection Digest Bull. 1. *9 p.* 1921.—The history of the organization of this American institute and the reasons for its existence are discussed. The constitution and by-laws are appended.—*F. D. Fromme.*

3391. Andres, H. **Verstorbene Botaniker des Vereinsgebietes. [Deceased botanists of the Society district.]** Sitzungsber. Naturhist. Ver. Preussisch. Rheinlande u. Westfalens **1919**: D22–D24. 1920.—The following botanists, belonging to the district of the Botanical Society of Westphalia and the Rhine, are briefly commemorated: Paul Friedrich August Ascherson, Professor of Botany at Berlin, a systematic botanist of international reputation, was born in Berlin, June 4, 1834, and died there on March 6, 1913; Bodewig, Ph.D., primarily a geologist but interested also in botany and the author of a manuscript flora of the Rhine, was born at Bergheim, February 24, 1843, and died at Cologne, February 19, 1915; Gustav Jakob Herpell, a resident of St. Goar and for some time an apothecary there, a diligent student of fungi and bryophytes, was born at St. Goar, October 31, 1828, and died there July 22, 1912; Jacobs, a teacher at Brohl, interested primarily in geology but also in botany, was born at Peterswald, July 13, 1868, and died at Brohl, November 20, 1914; Leo Melsheimer, an apothecary at Wittlich but also a florist, died at Wittlich, June 25, 1915, at the age of 46; Franz Roth, a resident of Münstereifel, interested in the local flora, died at Münstercifel, June 11, 1914, at the age of 71; Eduard Strasburger, professor of botany at Bonn, one of the most eminent botanists of Germany, especially in the fields of cytology and morphology, was born at Warsaw, Poland, 1844, and died at Bonn, May 19, 1912. In the case of Ascherson and Strasburger references are given to published obituary notices.—*A. W. Evans.*

3392. Blin, C. **[Obituary.]** Bull. Géog. Bot. **27**: 1–6. 1919.—This letter announces the death of the permanent secretary of the Académie Internationale de Botanique, Hector Leveillée, but expresses a hope that the academy may continue and asks that subscriptions to the Bulletin de Géographie Botanique be sent to the writer.—*W. G. Waterman.*

3393. Calvino, Mario. **La estación botánica del central "Soledad" de Cienfuegos. [The botanic station of the Soledad estate at Cienfuegos.]** Rev. Agric. Com. y Trab. [Cuba] **4**: 542–546. *8 pl.* 1921.—In 1901 E. F. Atkins established and provided for the maintainance of the Harvard Botanic Station for Tropical Research work and Sugar-cane Investigation. Harvard University placed the station under the direction of Mr. Oakes Ames, who placed Mr. Robert M. Grey in immediate supervision. A botanic garden was established containing aquatic and terrestrial exotic plants of economic and ornamental interest, some of the more interesting ones being: *Aleurites triloba*, a tree from whose seeds acid is extracted; *Coffea liberica; Eucalyptus citriodora; Sweitenia mahogoni* L., rare in Cuba and to be used in reforestation; *Nymphaea dentata;* and *N. stellata.*—A study was made of all varieties of foreign sugar canes noted for high sugar content to find those superior in Cuba to the variety Cristalina and to obtain seedlings and hybrids. Three series of experiments were inaugurated: (1) the selection of well-rooted plants with robust canes developing well on the shallow poorer soils, and their pollination with Cristalina, Caledonia Queen, and varieties from Barbados; (2) the use of seed plants of Cristalina and the more prolific and high sugar yielding varieties from Barbados, Demerara and Java, and their pollination with pollen from the more vigorous Harvard "seedlings;" (3) the selection of the best cane producing and sugar yielding varieties. The work has continued more than 10 years with the following results: (1) A type of cane was obtained superior to Cristalina in yield of cane, producing as much or more sugar at high altitudes in the less fertile, gravelly soils, but in fertile soil producing less sugar; the yield in cane was always larger and the plants better rooted, longer-lived, and less subject to diseases. (2) Many varieties were obtained of value for commercial use which produced more cane than Cristalina but with inconstant sugar content, for during the dry cold weather the total amount of cane and sugar was superior but during favorable weather there was a gain in the amount of cane and a diminution in sugar content as compared with Cristalina. (3) Despite a tendency of reversion to primitive types, at least 12 varieties were selected from thousands of "seedlings" which proved superior to Cristalina. In all cases fertility of the flowers was better and a great quantity of good seed was produced.—*G. R. Hoerner.*

3394. Cecil, George. **Mixed pharmacy in Malaya.** Druggists Circ. **66**: 219–220. 1922.—A description is given of the many queer practices among the pharmacists of the Federated Malay States.—*C. M. Sterling.*

3395. Dachnowski, A. P. **A question in national resources. The importance of a central station for peat and muck investigations.** Sci. Amer. **126**: 118. 1922.

3396. Denham, H. J. **Gossypium in pre-Linnaean literature.** Bot. Mem. [Oxford] 2. *24 p., 4 fig.* 1919.—This is a comprehensive review of references in the works of 50 authors from Herodotus, about 521 B.C., to Linnaeus' Systema Naturae in 1767. Theophrastus' description was the first in botanical literature and Pliny first used the word *Gossypium.* No mention of cotton is noted between classical writers and post-Renaissance herbalists, though the plant was known around the Mediterranean during this time. The earlier herbalists included *Bombax* and *Eriodendron* in the term *Gossypium*, and "cotton" was used to include other textiles, especially woolen cloth. The earliest figures are described and those of Fuchs (1542) and Matthiolus (1563), representing Levant cotton, *G. herbaceum*, cultivated in Crete, Malta, Sicily, and Italy and in gardens of France and Germany, are reproduced, as is the wood cut by Alpinus in his flora of Egypt (1592) representing *G. arboreum.* Ximenes published in Mexico (1615) the first description of a New World cotton. The Hortus Malabaricus of van Rheede figured *G. neglectum.* In 1700 Tournefort defined the genus and elaborately figured the floral mechanism. Confusion resulted from the very different treatment of the species in Linnaeus' Species Plantarum (1753) and Systema Naturae (1767–70), which is not simplified by an examination of the Linnaean Herbarium. If the classification by Linnaeus is to have any value, the earlier arrangement must be followed. The author believes that cotton evolved independently in India and in America. The antiquity of the genus is proved by the presence in Australia of an indigenous cotton, and by the differences between early American and Old World types. The geographical distribution of *Gossypium* has been greatly confused by cultivation and by the regression of "escaped" plants. A purely deductive use of general biological probabilities may throw much light on the production of varieties, mutants, and hybrids. The author promises in a subsequent paper to give the modern classifications and to discuss an arrangement of present day species and varieties.—*Frederick L. Lewton.*

3397. Fabricius. [Rev. of: Morstatt, H., Compiler. **Bibliographie der Pflanzenschutzliteratur. Das Jahr 1920.** Biol. Anstalt Land- u. Forstw. Berlin-Dahlem. Paul Parey and Julius Springer: Berlin, 1921.] Forstwiss. Centralbl. **43**: 475. 1921.—This is a new annual publication, citing the material published in the field of plant protection and diseases. It does not entirely fill the place of Hollrung's journal, which appeared from 1898 to 1913, which gave brief abstracts of the cited articles.—*W. N. Sparhawk.*

3398. Geisenheyner, Ludwig. **Einige Nachträge zu meiner Arbeit über die Physica der heiligen Hildegard. [Supplementary notes to my work on the Physica of St. Hildegarde.]** Sitzungsber. Naturhist. Ver. Preussisch. Rheinlande u. Westfalens. **1916**: D15–D24. 1918.—An earlier study dealing with the Physica of St. Hildegarde of Bingen, a work written in the 12th century but not printed until 1533, was published by the author in the 1911 volume of these transactions. In the present series of notes he discusses 4 plant names appearing in the Physica, interpreting them as follows: "Kurbesa," the bottle gourd, *Lagenaria vulgaris;* "Rifelbere," the whortleberry, *Vaccinium Myrtillus;* "Felbaum," the willow, *Salix alba,* and "Harbaum," a misprint for "Sarbaum," the poplar, *Populus alba.*—*A. W. Evans.*

3399. Geisenheyner, L[udwig]. **Ew. H. Rübsaamen.** Sitzungsber. Naturhist. Ver. Preussisch. Rheinlande u. Westfalens. **1919**: D18–D22. 1920.—Rübsaamen was born at Hardt a. d. Sieg, Germany, May, 1857, and died at Berlin, March, 1919. Although primarily an entomologist, he was greatly interested in plant-galls and his most important scientific contribution was a richly illustrated work on this subject in 3 volumes, only 2 of which have as yet been published. In the early part of his career he taught in various schools but later held scientific positions under the government.—*A. W. Evans.*

3400. Gerould, J. H. **Lamarck, Mirbel and the cell theory.** Science 55: 421–422. 1922. The writer points out that the cell theory in broad outlines was taught in Paris 40 years before Schleiden and Schwann published their work.—*C. J. Lyon.*

3401. Grams, H. **Die Kulturpflanzen und Unkräuter der Wikinger. [The cultivated plants and weeds of the Vikings.]** [Rev. of: Holmboe, Jens. **Nytteplanter og ugraes i Osebergfundet. [Useful plants and weeds in the Oseberg discovery.]** Osebergfundet Vol. V. Kristiania, 1921.] Naturwiss. Wochenschr. 21: 81–85. 1922.—In 1903, the remains of a Viking ship of the middle of the 9th century was found at Oseberg, at the mouth of Kristiania fjord in Norway. The ship was the sepulcher of a queen, with her maid, horses, oxen, and dogs. One half a shell of walnut (*Juglans regia*) was found in the ship, also oats and wheat, as well as rye meal, and seeds of *Lepidium sativum typicum, Linum usitatissimum, Cannabis sativa,* and remains of pods of *Isatis tinctoria.* Of native plants, there were a large number of hazel nuts (*Corylus avellana*) and fruits of *Malus silvestris.* Among the grain and cress seeds and between feathers in the burial chamber were found seeds of *Polygonum lapathifolium?, P. convolvulus, Chenopodium album, Urtica urens, Stellaria media, Capsella Bursa-pastoris. Lamium purpureum, ?Galeopsis tetrahit,* and *Cirsium arvense.* The remains of various other species were found about the vessel and in the stomach contents of the oxen and horses. Besides direct reference to the material discovered in the Viking ship, the reviewer mentions other sources of information concerning the food plants of the ancient inhabitants of northern Europe.—*A. J. Pieters.*

3402. Hoffman, G. N. **Irish healing skill hereditary.** Pharm. Era 55: 175–176. 1922.—A brief review is given of some of the Celtic and Druidic practices and traditions running back many centuries, and of the potions, charms, and religion associated with the ancient beliefs.—*C. M. Sterling.*

3403. Kopeloff, Nicholas, and Lillian Kopeloff. **The bacteriology and mycology of cane sugar deterioration.** Absts. Bact. 6: 221–225. 1922.—A brief, historical review of the literature is given, with 54 bibliographical citations dealing with the inversion of cane sugar.—*D. Reddick.*

3404. Lee, H. Atherton, and Colin G. Welles. **Phytopathological Society in the Philippines.** Phytopathology 11: 516. 1921.—The Philippine Phytopathological Society was organized at a meeting in Manila, August 6, 1921, with a charter membership of 22.—*B. B. Higgins.*

3405. Loria, Gino. [Rev. of: Mieli, A. **Gli scienziati italiani del Medio Evo ai nostri giorni. [Italian scientists from the Middle Ages to our times.]** Vol. I. *236 p.* Attilio Nardecchia: Rome, 1921. *L. 45.*] Scientia 31: 307–308. 1922.

3406. Martelli, Ugolino. **Odoardo Beccari.** Webbia 5: 295–343. 1921.—Odoardo Beccari was born at Florence, November 16, 1843. He entered the Ferdinando College of Lucca, where he came into contact with Ignazio Mezzetti, who awakened his interest in natural science. In 1861 he left to attend the University of Pisa, attained the post of assistant to the chair of botany, and remained until 1864 when he transferred to University of Bologna to complete his studies. After spending some time in London, Beccari sailed in 1865 for Borneo where he remained for 3 years making botanical and zoological collections. He returned to Florence, founded the Nuovo Giornale Botanico Italiano, and departed in 1871 for New Guinea, together with Luigi D'Albertis, after having made a 6-months' visit to Abyssinia. Beccari spent 4 years exploring the East Indies, returned to Florence, and, after another 2-years' voyage, touching Australia, Tasmania, etc., settled down to a life of study, devoting his main efforts to the Palmae, and publishing voluminously. He died October 25, 1920.—*John M. Fogg, Jr.*

3407. Marvin, F. S. **The science of ancient Greece.** [Rev. of: Livingstone, R. W., Editor. **The legacy of Greece.** *xii + 424 p.* Clarendon Press: Oxford, 1921.] Nature **109:** 169. 1922.

3408. Morstatt, H. **The Biologische Reichsanstalt at Berlin-Dahlem and the plant protection service in Germany.** Phytopathology **12:** 23–24. 1922.—The work of the Biologische Reichsanstalt has been greatly enlarged by the addition of an economic section with special laboratories for the study of special crops. A new journal, Nachrichtenblatt für den Deutschen Pflanzenschutzdienst, is being published.—*B. B. Higgins.*

3409. Nordmann, V. **Oversigt over naturvidenskabelige Undersøgelser i Grønland [Review of scientific investigations in Greenland.]** Nat. Verden **5:** 209–227. *7 fig.* 1921.—In this short review of 200 years' investigation an account of botanical studies is included. About 340 spermophytes, 30 pteridophytes, 600 bryophytes, more than 700 fungi, 300 lichens, and 200 algae are known.—*Ernst Gram.*

3410. Quisumbing, Francisco A. **Philippine contributions on agricultural, biological and industrial chemistry.** Philippine Agric. **10:** 113–123. 1921.—A bibliography is presented of papers published in the Philippines during 14 years (1906–1920). Most of the work was done by the Bureau of Science and by the University of the Philippines. Many of the articles cited deal with soils and fertilizers, or with the chemistry of plant products.—*Sam F. Trelease.*

3411. Ritter, William E. **Ellis L. Michael and his scientific work.** Ecology **2:** 70–72. 1921.—A biographical sketch and appreciation is presented of the work of Ellis L. Michael, who was ecologist, author, and investigator at Scripps Institute, La Jolla, California, from 1905 to 1920.—*H. H. M. Bowman.*

3412. Roberts, W. **An Italian broadside, 1612.** Gard. Chron. **71:** 180. *Pl. 93.* 1922.—The identity of a conventionalized figure of a plant called "Maranto," probably in honor of the Italian doctor and botanist, Bartolommeo Maranti, is discussed. It is of probable East or West Indian origin and the figure is published in the hope that some reader may recognize it.—*P. L. Ricker.*

3413. Shear, C. L. **Frederick Georg Emil Rostrup.** Phytopathology **12:** 1–3. *Pl. 1.* 1922.—A brief sketch of the life and work of this Danish botanist is given.—*B. B. Higgins.*

3414. Thomson, J. Arthur, Editor. **The outline of science, a plain story simply told. Vols. I–IV.** *1220 p., more than 800 illus., 40 in color.* G. P. Putnam's Sons: New York and London, 1922.

3415. Tillery, R. G. **The agricultural experiment station of Cuba.** Louisiana Planter **67:** 235–237. 1921.—A history and description are given of the Agricultural Experiment Station of Cuba located at Santiago de las Vegas, with a discussion of the work in progress.—*C. W. Edgerton.*

3416. Winkler, Fr. **Aus der Entwicklungsgeschichte der Blumenzucht. [The history of development of flower-growing.]** Gartenwelt **25:** 9–10. 1921.

3417. Yule, Emma S. **Rice growing portrayed in Chinese art.** [Rev. of: Riefstahl, Meyer R. **The pictures of plowing and weaving.** Asia, December, 1920, and January, 1921.] Philippine Agric. **10:** 131–134. 1921.—The author reviews 2 articles on an old book, Keng Chi-tu, which appeared about 1145 A.D. and contains pictures, with descriptive commentaries, of Chinese methods of planting and plowing.—*Sam F. Trelease.*

3418. Yule, Emma S. The Chinese Imperial spring plowing. Philippine Agric. 10: 407-409. 1922.—The Imperial spring plowing in the Temple of Agriculture, near Peking, originated about 2300 B.C. The festival was not really a religious ceremony, its object being to place and to hold tilling of the soil in China as the most honorable labor, the Sacred and Mighty Emperor himself not disdaining to hold the plow and turn the furrow. Today the Temple of Agriculture is a recreation park; splendid trees are preserved, and new ones of many varieties, as well as interesting and beautiful shrubs, are being planted.—*Sam F. Trelease.*

BOTANICAL EDUCATION

C. Stuart Gager, *Editor*

Arthur H. Graves, *Assistant Editor*

(See also in this issue Entries 3343, 3344, 3818, 3890, 3892, 4077, 4167, 4279, 4595, 4603, 4713)

3419. Anonymous. **Definiciones con relación a la nomenclatura botánica. [Definitions with relation to botanical nomenclature.]** Rev. Agric. Com. y Trab. [Cuba] 4: 591-592. 1921.

3420. Anonymous. **Education in forestry. Proceedings of the second national conference, New Haven, Conn. December 17-18, 1920.** U. S. Bur. Education Bull. 44. *iii + 69 p.* 1922.

3421. Anonymous. **Ex-Secretary Meredith on research.** Science 53: 356-357. 1921.—This note consists chiefly of quotations from former U. S. Secretary of Agriculture Meredith's article in the Country Gentleman for Feb. 26, 1921.—*C. J. Lyon.*

3422. Anonymous. [Rev. of: Beck, Conrad. **The microscope.** *144 p., 131 fig.* R. & J. Beck: London, 1921.] Sci. Prog. 17: 165-166. 1922.

3423. Anonymous. [Rev. of: Giberne, Agnes. **The garden of earth.** *xiv + 178 p., 47 illus.* Society for Promoting Christian Knowledge: London.] Sci. Prog. 16: 490. 1922.

3424. Anonymous. [Rev. of: Smith, Annie L. **Lichens.** *xxviii + 464 p., 135 fig.* Cambridge University Press: 1921 (see Bot. Absts. 11, Entry 3459).] Sci. Prog. 16: 488-489. 1922.—[See also Bot. Absts. 11, Entries 2748, 2749.]

3425. Anonymous. [Rev. of: Woolsey, T. S., with two chapters by Greeley, W. B. **Studies in French forestry.** *xxvi + 550 p., 21 fig.* John Wiley & Sons: New York; Chapman and Hall: London, 1920.] Sci. Prog. 16: 487. 1922.—[See also Bot. Absts. 10, Entry 506.]

3426. Achariar, K. Ranga, and C. Tadulinga Mudaliyar. **A hand-book of some South Indian grasses.** *318 p., 228 fig.* Government Press: Madras, 1921.—This is a manual designed to facilitate identification of the commoner grasses of the plains of South India. The scope of the book is indicated by the chapter titles: Introduction; The vegetative organs; Inflorescence and flower; Histology of the vegetative organs; Classification; and 5 chapters of detailed descriptions of about 100 species of grasses. There is a full page figure of each species.—*Winfield Dudgeon.*

3427. Atwood, Wm. H. **Civic and economic biology.** *xv + 470 p., 364 illus.* P. Blakiston's Son & Co.: Philadelphia. 1922.—The book is written primarily for 2nd-year high school pupils. "Subject matter divided into seven units, which are given in the best order for a year's course, beginning in September." The 7 units are: How plants and animals live (45 pp.); The relation of life to food (plant nutrition, 52 pp., animal nutrition, 18 pp.); The responses of plants and animals (44 pp.); Problems of growth and reproduction (98 pp.); Plant and animal breeding (problems which have been solved, 20 pp., problems which are being solved, 35 pp.); The doctrine of evolution (14 pp.); A few problems in civic and economic biology (99 pp.).—*C. S. Gager.*

3428. Bade, E. **Artificial plants in the making. The study of osmosis under natural and artificial conditions.** Sci. Amer. **126**: 171. *5 fig.* 1922.—Ways of producing Traube's cells by chemical means are described.—*Chas. H. Otis.*

3429. Beaumont, A. B. **The field problem in the soils course.** Jour. Amer. Soc. Agron. **14**: 79–88. 1922.—Field exercises of the Massachusetts Agricultural College are given.—*F. M. Schertz.*

3430. Bradford, F. C. **Problems in teaching freshmen pomology.** Proc. Amer. Soc. Hort. Sci. **18**: 241–245. 1921 [1922].—Previous to college the student has had a more or less closely disciplined training. In college he is thrown largely upon his own resources, and it is the teachers' problem to help him through this transitory stage. There is as great need for experienced teachers in this work as in the advanced courses, yet as a rule this work is assigned to the more or less inexperienced men. A discussion of what shall be taught and how is taken up.—*W. E. Whitehouse.*

3431. Brown, Percy Edgar. **The teaching of soil bacteriology.** Jour. Amer. Soc. Agron. **13**: 323–329. 1921.—The author discusses the problems and methods.—*F. M. Schertz.*

3432. Clute, W. N. **Botany for beginners II.** Amer. Bot. **28**: 60–67. 1922.

3433. Clute, W. N. **Plant names and their meanings XI. Leguminosae III.** Amer. Bot. **28**: 70–77. 1922.

3434. Feilitzen, H. von. **Vad göres i de olika nordiska länderne för främjande av växtodlingen? [What is done in the different Scandinavian countries to promote plant culture?]** Nordisk Jordbrugsforskning **1921**: 44–68. *8 fig.* 1921.—Sweden has a central experiment station near Stockholm, founded 1907, and experimental fields are maintained at agricultural schools; but the work, although recently supported by donations, is insufficient and plans for extension are under preparation. Besides private institutions, colleges and associations contribute largely to the experimental work and to plant breeding. In 1920 Sweden had 52 plant culture consultants. Norway has had a state experiment field at the college at Aas since 1898, 6 local experiment farms, the experiment farm of the moor association, and the experiments of the weed-extermination consultant. Several associations and schools conduct local experiments. The local consultants have several tasks in addition to the promotion of plant culture.—Denmark has a much more intensive plant production. The state maintains 10 agricultural experiment farms, 3 horticultural stations, and special departments for weeds, phytopathology, and the testing of root crops. The associations are charged with all the local experiments (1920: 80 local plant production consultants and 2500 local experiments).—Finland has had an agricultural experiment station at Ånäs since 1907, connected with the university; local stations are planned. A plant breeding association and a moor association have experiment farms, and several of the farmers' associations maintain experiment farms while nearly all of them have farm bureau managers.—*Ernst Gram.*

3435. Gager, C. Stuart. **Eleventh annual report of the Brooklyn Botanic Garden, 1921.** Brooklyn Bot. Gard. Rec. **11**: 25–91. 1922.—The report includes a brief account of investigations in plant pathology, ecology, and genetics carried on at the Botanic Garden during 1921. There is also given (Appendix 6) the "Agreement between the editorial board of *Genetics* and the Brooklyn Botanic Garden concerning the publication of the journal *Genetics*."—*C. S. Gager.*

3436. Gravis, A. **De l'enseignement des sciences physiques et naturelles dans les établissements d'éducation moyenne.** [On the instruction in physical and natural sciences in institutions of secondary education.] Arch. Inst. Bot. Univ. Liège **5**: 20 p. 1914 [1920].—Considerations are presented on the subject of the organization of the course of secondary instruction in Belgium.—*Henri Micheels.*

3437. Gravis, A. **L'enseignement normal des sciences.** [Normal instruction in the sciences.] Arch. Inst. Bot. Univ. Liège **5**: 30 p. 1914 [1920].—The address delivered at the opening session of the course at the University of Liege in 1912 is here published.—*Henri Micheels.*

3438. Gravis, A. **Quelques réflexions au sujet de l'enseignement de la botanique.** [Some considerations on the subject of instruction in botany.] Arch. Inst. Bot. Univ. Liège **5**: 93 p., *2 pl.* 1914 [1920].—A résumé of an elementary course in botany is presented, with considerations and advice on the subject of methodology.—*Henri Micheels.*

3439. Henning, E. **Växtpatologiens ställning ved lantbruksundervisningen.** [The position of phytopathology in agricultural instruction.] Nordisk Jordbrugsforskning **1921**: 321–327. 1921.—The courses in phytopathology at agricultural schools should be based on field trips, a notebook system, and simple field experiments. At the college microscopic determinations of fungi, pure culture methods, and control experiments should be added. The students should, when they leave college, remain phytopathological reporters and amateurs. As in Denmark, which for 40 years has had a special chair of phytopathology, it is highly desirable that in Sweden also this branch be segregated from botany.—*Ernst Gram.*

3440. Holm, G. **Fortbildungs und Schulfragen.** [Training and school questions.] Gartenwelt **26**: 138–141. 1922.—The author presents a general consideration of horticultural education in Germany, and an outline of lectures and practical courses being given for (1) training schools, (2) gardeners' schools, (3) horticultural schools, and (4) horticultural colleges.—*J. C. Th. Uphof.*

3441. Holm, Herm. **Schulgarten und Schulgärtner.** [Schoolgardens and schoolgardeners.] Gartenwelt **25**: 133–134, 141–142. 1921.

3442. Hutchison, C. B. **The elementary course in genetics.** Science **55**: 416–421. 1922.—Genetics should be studied by both plant and animal illustrative material. The objective should be primarily cultural and secondarily informational (for an agricultural college, at least). The scope and contents of a course (16 weeks) at Cornell University is outlined.—*C. J. Lyon.*

3443. Illing. **Der botanische Garten in Berlin-Dahlem, ein Bildungsinstitut für junge Gärtner.** [The botanical garden in Berlin-Dahlem, a training institution for young gardeners.] Gartenwelt **25**: 24. 1921.

3444. Illing. **Ueber die Besetzung gärtnerischer Lehrämter.** [Filling horticultural instructorships] Gartenwelt **24**: 493–495. 1920.

3445. Janson, A. **Zur Hochschulfrage.** [The college question.] Gartenwelt **24**: 165–167. 1920.

3446. Macbride, Thomas H. **The North American slime-moulds.** *New and rev. ed., xvii + 347 p., 23 pl.* MacMillan Co.: New York, 1922.—In this edition the author corrects sundry typographical and other errata in the preceding edition; and also incorporates such new information in reference to individual species and to the entire subject as the researches of more recent years afford. "The present volume is intended especially for American readers and is accordingly particularly devoted to a discussion of species so far reported on the western continent." A brief description of some other forms, and reference to many extra-limital species now generally recognized, are also included. As to nomenclature, the author says: "By general consent, of course, we strive to ascertain the oldest name on the list; the first that is really and clearly applicable, and we write all other names down as synonyms. In this volume a list of synonyms often accompanies the description; precedes it, showing, year by year, the history of the case; an abstract in fact of the title, as at last approved. The preparation of such an abstract . . . . must be made, indeed, if we are ever in our discussions to be sure that when we speak or write in America, we are dealing with the same thing intended by the man who speaks or writes in England, or elsewhere."—*C. S. Gager.*

3447. McCall, A. G. **A uniform first course in soils for agricultural colleges.** Proc. Ann. Meetings Promotion Agric. Sci. 40/41: 74–77. 1919/20 [1921].—A review is presented of recent discussions on teaching soils, and a report of a conference held in June, 1920, at the University of Kentucky, where representatives of 16 agricultural colleges met to consider this subject.—*Lyman Carrier.*

3448. McClung, C. E. [Rev. of: Sharp, L. W. **An introduction to cytology.** *452 p., 159 illus.* McGraw-Hill Book Co.: New York, 1921.] Science **55**: 482–483. 1922.—[See also Bot. Absts. 11, Entry 230.]

3449. Mansfield, William. **Botany, developmental and descriptive.** *vii + 232 p., 135 fig.* Lea & Febiger: Philadelphia and New York, 1922.—The first page of reading matter following page vii is number 17. The chapter headings of Part I, Developmental Botany, are (after the introduction, algae, fungi, liverworts, mosses, ferns, horsetails, gymnosperms, monocotyledonous angiosperms, dicotyledonous angiosperms. The chapter headings in Part II, Descriptive Botany, are: roots, stems, buds and leaves, inflorescence, flowers, fruits, seeds (including seed and fruit dispersal).—*C. S. Gager.*

3450. Mattoon, W. R. **Botanic garden and arboretum for the Nation.** Amer. Forestry **28**: 8–11. *3 fig., 1 map.* 1922.—A plan for the development of a great national arboretum and botanic garden at Washington, D. C., is briefly considered.—*Chas. H. Otis.*

3451. Mendiola, Nemesio B. **Instruction and investigation in plant breeding in the Philippines.** Philippine Agric. **10**: 105–107. *2 pl.* 1921.—The author describes very briefly the nature of the work in teaching and research at the College of Agriculture, Los Baños, Philippine Islands.—*Sam F. Trelease.*

3452. Morris, Robert T. **Nut growing.** *x + 236 p., 29 fig.* Macmillan Co.: New York, 1921.—Part I (pp. 1–39) is entitled General Notes. Part II, Propagation, contains chapters on: 1. seeds, soils, transplanting; 2. grafting; 3. hybrids; 4. orchard care,—intercropping, pruning, parasites. Part III, Species and Varieties, contains 8 chapters on hickories, walnuts, hazels, chestnuts, pines, beech, oaks, almonds. The author states (p. 3) that "nut trees of many kinds are capable of furnishing all of the proteins, oils, and vitamines belonging to the meat group of foods," and that (pp. 21–22) "the twentieth century is to go on record for the sudden emergence of nut culture," favored by greater yield per acre of nut trees over ordinary field crops, and by increasing shortage of farm labor combined with comparatively slight amount of labor required to grow and harvest nut crops.—*C. S. Gager.*

3453. Nordmann. **Gärtnerische Winterschulen.** [Horticultural winter schools.] Gartenwelt **25**: 129–130. 1921.

3454. Rangachari, K. **A manual of elementary botany for India.** *2nd ed., xx + 572 p., 494 fig.* Government Press: Madras, 1921. *Rupees 4.*—Intended originally for the students of the Agricultural College, Coimbatore, this book has been revised and extended to make it suitable for intermediate college students throughout India. New material and illustrations have been scattered through the old chapters, and 14 entirely new chapters, on: the cell, tissues, nutrition, cryptogams, gymnosperms, evolution, heredity, Engler's system of classification, and reference books, have been added.—*Winfield Dudgeon.*

3455. Rosenthal, Willy. **Prüfungen im Gartenbau.** [Examinations in horticulture.] Gartenwelt **25:** 41-43. 1921.

3456. Rosenthal, Willy. **Titel im Gartenbau.** [Titles in horticulture.] Gartenwelt **25:** 13-14. 1921.

3457. Salisbury, E. J. **The study of human implements as an aid to the appreciation of principles of evolution and classification.** New Phytol. **20:** 179-184. 1921.—The progress of the development of man's implements offers a valuable analogy with respect to the general principles of evolution. The whole course of the evolution of implements may be followed from the crude efforts of prehistoric man to the modern tools. Such a series furnishes a concrete illustration of evolutionary progress of great pedagogical value. The implement inherits its form by tradition from one generation to the next, while each age impresses its environment upon it.—*I. F. Lewis.*

3458. Shufeldt, R. W. **Nature study in our public schools.** Amer. Forestry **27:** 717-724. *Fig. 1-10.* 1921.

3459. Smith, Annie Lorrain. **Lichens.** *xxvii + 464 p., 135 fig.* Cambridge University Press: 1921.—This volume is one of the series of Cambridge Botanical Handbooks, edited by A. C. Seward and A. G. Tansley. Publication was delayed owing to war conditions. The chapter headings are as follows: I. History of lichenology (previous to 1694, 1694-1867, and after); II. Constituents of the lichen thallus; III. Morphology; IV. Reproduction; V. Physiology; VI. Bionomics (growth and duration, season of fruit formation, dispersal and increase, erratic lichens, parasitism, diseases of lichens, harmful effect of lichens, gall-formation); VII. Phylogeny; VIII. Systematic. "Lichen development is the result of two organisms mutually affecting each other, but as the fungus provides the reproductive system, it is the dominant partner; the main lines of classification are necessarily determined by fruit characters. The algae occupy a subsidiary position, but they are also of importance in shaping the form and structure of the thallus. The different phyla are often determined by the presence of some particular alga; it is in the delimitation of families that the algal influence is of most effect." IX. Ecology; X. Economic and technical. The chapters are preceded by a glossary, errata, and an introduction. In the introduction the author refers to the prolonged controversy as to the true nature of lichens, particularly as to whether they are independent organisms or parasitic fungi, and says: "No theory of simple parasitism can explain the association of the two plants: if one of the symbionts is withdrawn—either fungus or alga—the lichen as such ceases to exist. Together they form a healty unit capable of development and change: a basis for progress along new lines. Permanent characters have been formed which are transmitted just as in other units of organic life. . . . Lichens are plants of physiological symbiotic origin, and that aspect of their life-history has been steadily kept in view in this work." [See also Bot. Absts. 10, Entry 629; 11, Entries 2748, 2749, 3424, 4277.]—*C. S. Gager.*

3460. Vestal, A. G. **A new profession. The recreation engineer and his part in making our vacations worth while.** Sci. Amer. **125:** 196, 207, 209. *4 fig.* 1921.

3461. Woodhead, T. W. **Junior botany.** *210 p., 140 fig.* Clarendon Press: Oxford, 1922.—This is an abridged and simplified edition of The Study of Plants by the same author, and is intended to serve as an introduction to the study of the life-work of common flowering plants, suitable for a junior course. The book is intended to be used only in connection with the study of living material. Part I (11 chapters, 135 pages) considers The Vegetative Organs, taking the garden stock (*Matthiola* sp.) as a type-plant. Part II (6 chapters, 74 pages) is entitled The Reproductive Organs, including flower structure, pollination, seed-formation, structure of fruits, and dispersal of fruits and seeds.—*C. S. Gager.*

CYTOLOGY

Gilbert M. Smith, *Editor*
Geo. S. Bryan, *Assistant Editor*

(See in this issue Entries 3823, 3847, 3870, 4253, 4485, 4685, 4686, 4887)

ECOLOGY AND PLANT GEOGRAPHY

H. C. Cowles, *Editor*
George D. Fuller, *Assistant Editor*

(See also in this issue Entries 3284, 3298, 3316, 3374, 3393, 3409, 3699, 3714, 3717, 3719, 3739, 3767, 3768, 3781, 3796, 3802, 3857, 3863, 3917, 3980, 4059, 4135, 4201, 4207, 4210, 4219, 4222, 4223, 4234, 4236, 4237, 4238, 4239, 4240, 4244, 4246, 4261, 4262, 4273, 4274, 4411, 4563, 4576, 4619, 4694, 4697, 4710, 4715, 4725, 4745, 4784, 4788, 4790, 4791, 4793, 4794, 4795, 4803, 4823, 4830, 4831, 4840, 4842, 4843, 4844, 4847, 4848, 4851, 4864, 4869, 4872, 4882, 4883, 4885)

FACTORS, MEASUREMENTS

3462. Amann, J. **Contribution à l'étude de l'edaphisme physicochemique. [Contribution to the study of physico-chemical edaphism.]** Bull. Soc. Vaudoise Sci. Nat. **52**: 363–381. 1919. —The author studied the relation of soil reaction to the growth of species of mosses. The reaction of the substratum was determined in all cases by the use of a new indicator, the "panchromatic indicator," consisting of a mixture of dimethyl-diaminotohephenazine chloride, tetraethyldiparaaminotriphenylcarbinol sulphate, and sodium diethylamino-benzenesulphonate, which served to show quite accurately the degree of acidity as well as akalinity. It was found that an apparently uniform soil often shows great differences of a quantitative sort, and, not infrequently, even qualitative differences with respect to reaction. For example, the surface layers may be neutral, while the underlying layer is acid. Wind deposits, running water, and weathering may introduce differences between individual masses of soil. The different species were found to fall into 4 categories: (1) basiphiles, (2) oxyphiles, (3) neutrophiles, and (4) indifferent forms, in each of which are to be recognized obligate and facultative types. Among the facultative types may be distinguished those that thrive on neutral or acid substrata, the basineutrophiles, and those that thrive on neutral and acid soil, the oxyneutrophiles. Of the species determined with respect to soil reaction, 21 are listed as being oxyphilic, 22 as oxyneutrophilic, 35 as neutrophilic, 10 as basineutrophilic, 42 as basiphilic, and 14 as indifferent. The important influence of calcium in edaphic relations the author attributes largely to the ionization effected in the substratum. Moss associations, of a fairly definite kind, were found to be characteristic of soils of certain reactions. A special study of the genera *Pterygoneurum* and *Pottia* was made, and different species investigated relative to their adaptation to soil reaction.—*Charles Drechsler.*

3463. Arthur, J. M. **Influence of environment on form and structure.** [Rev. of: Folsom, Donald. **The influence of certain environmental conditions, especially water supply, upon form and structure in Ranunculus.** Physiol. Res. **2**: 209–276. *24 fig.* 1918 (see Bot. Absts. 1, Entry 1484; 2, Entries 307, 645).] Bot. Gaz. **69**: 271. 1920.

3464. Atkins, W. R. G. **Relation of the hydrogen-ion concentration of the soil to plant distribution.** Nature **108**: 81. 1921.—The author quotes some results obtained in the British Isles during the past year. *Sedum acre* flourishes at pH 7–8 or over, and *S. anglicum* at pH 6.8–

5.1. Plants regarded by some as typical of limestone districts may be found elsewhere if the reaction is suitable. *Salvia verbenacea* flourishes at pH 7–8, *Crithmum maritimum* at about pH 8, *Cochlearia danica* and *Linaria cymbalaria* at pH 7.5–8, and *Centranthus ruber* at pH 7.4–8.8. *Ulex europaeus*, usually growing on acid soil, was found at pH 6.8–5.4 but some plants at 8.1–8.6. *Armeria maritima* occurs at pH 6.8 and 8.2, but typical sand-dune plants,—*Ammophila arenaria, Euphorbia Paralias, Salsola Kali,*—only at about pH 8. Moorland plants, *Erica tetralix, Anagallis tenella, Drosera rotundifolia, Jasione montana,* etc. are found at pH 5.5–5.0.—*O. A. Stevens.*

3465. Buscalioni, L. **Le precipitazioni in montagna ed i loro rapporti colla vegetazione.** [Precipitation in mountain regions in relation to vegetation.] Malpighia 29: 205–230. *Pl. 4, fig. 1–8.* 1920.—Data are given by means of graphs on the precipitation in mountain regions, particularly in regard to the time of melting snow on high slopes, both those facing north and those with a southern exposure. Attention is called to the fact that in the dry localities the vegetation is composed chiefly of deciduous species, while a greater number of evergreens grow in the less arid situations.—*Edith K. Cash.*

3466. Darwin, Francis. **Studies in phaenology, no. 2: 1920.** New Phytol. **20**: 30–38. 1921.—Continuing earlier studies, flowering dates for 272 species are given and the connection pointed out between the early flowering and the high spring temperatures in 1918 and 1920.—*I. F. Lewis.*

3467. Fisher, E. A. **Relation of the hydrogen-ion concentration of the soil to plant distribution.** Nature **108**: 306. 1921.—The importance of this is rapidly becoming appreciated but there is a tendency to apply with little change methods which have been standardized, for other purposes. The colorimetric method of measurement should be given more attention. Fineness of division of the soil is a factor influencing the apparent value as determined colorimetrically and more data are needed from this standpoint. In some soils the actual value at time of determination may be of less value than the rate of change under natural conditions. Local variations in light soils are important.—*O. A. Stevens.*

3468. King, Charlotte M. **Phenological notes for Iowa 1920.** Rept. Iowa State Hort. Soc. **55**: 117–123. 1920.—*Salix discolor* first bloomed at Boone on March 12; the soft maple at Ames on March 26, and on the same date at Boone and Lansing; *Corylus americana* on March 5. Temperature tables for Ames, Lansing, and Boone are given.—*L. H. Pammel.*

3469. Olsen, Carsten. **The ecology of Urtica dioica.** Jour. Ecol. **9**: 1–18. *1 pl.* 1921.—The common nettle is abundant in Denmark, growing mostly in close communities. This gregarious habit is due to the activities of horizontal rhizomes which also account for the sharpness of the boundaries separating it from other vegetation. It thrives well in full light and in shade up to 5–10 per cent of open daylight, the greatest vigor being shown in 10–20 per cent of full illumination. A moderate amount of soil moisture also seems necessary to meet its requirements, but while Olsen has determined the percentage of soil moisture in the habitats under consideration, he has not attempted to determine the growth water available.—By several authors *Urtica dioica* has been placed among nitrogen requiring plants, and the principal feature of this investigation is the experimental examination of this quality. Microchemical tests showed that the plants themselves always contain a considerable amount of nitrates, especially in the stems, rhizomes, and roots. Soil samples were then taken, at a depth at which the roots of the plant abound, in 20 localities, some within and others without the nettle communities. The nitrate content of such samples was determined both at once when they were taken and again after the soil had been kept moistened in a jar at 18°C. for 25 days. This procedure was for the purpose of obtaining an expression of the nitrifying power of the soil. These data were tabulated together with the H-ion concentration, the percentage of soil moisture, and the light value of the locality. An inspection of the resulting table makes it clearly evident that the only factor varying directly with the presence of

Urtica dioica is the nitrate content of the soil.—Experimental cultures of the plant were made using portions of rhizomes planted in washed sand and watered with nutrient solutions containing varying amounts of nitrates. Growth was in direct proportion to the relative amounts of available nitrogen, hence the conclusion was reached that *Urtica dioica* in nature is able to make sufficiently vigorous growth to enable it to compete successfully with other vegetation only where there is a relatively large amount of nitrogen in available form present in the soil.—The experiment also showed that nitrification proceeds in soils showing an acid reaction as high as pH 3.6, and that ammonium used as a source of nitrogen was toxic to the nettle.—*Geo. D. Fuller.*

3470. Rayner, M. C. **The ecology of Calluna vulgaris. II. The calcifuge habit.** Jour. Ecol. **9**: 60–74. *1 pl.* 1921.—The earlier publication on this subject [New Phytol. **12**: 59–76. 1913] established the facts that *Calluna vulgaris* occurs in small and sharply defined communities on the Wiltshire and Berkshire Downs and that there is associated with it an endophytic fungus growing in obligate association of such a nature that the *Calluna* in seedling condition is in complete dependence upon infection by the endophyte at a critical stage. In the present paper it is shown that, in nature, *Calluna* will not grow on calcareous soils, its development being so weak that it is soon eliminated by competition. There is an unknown inimical factor of chemical nature in the calcareous soils. This does not affect the endophyte when growing outside the plant but probably alters the infectibility of the root cells and their relations with the mycelium after infection.—*Geo. D. Fuller.*

3471. Snow, Laetitia M. **Diaphragms of water plants. II. Effect of certain factors upon development of air chambers and diaphragms.** Bot. Gaz. **69**: 297–317. *3 fig.* 1920.—The rate of growth of *Scirpus validus* is greater in water than in air, and greater at high than at low temperatures. Slowing of growth is accompanied by an increase in the diaphragm distance, since fewer diaphragms are formed. Lowered atmospheric pressure has no effect on the number or size of the air chambers in *Scirpus validus* or *Cyperus alternifolius*, and it is concluded that water with low oxygen content is not the direct cause of air spaces in aquatics or that the species studied are non-plastic.—*H. C. Cowles.*

3472. Weevers, Th. **De plantengroei van het eiland Goeree in verband met zyn bodem en geschiedenis.** [The flora of the island of Goeree in connection with its soil and history.] Nederland. Kruidk. Arch. **1920**: 80–139. *1 map.* 1921.—The author gives an enumeration of the plants of the island and treats in detail the marked difference between the calcifuge flora of the inland dunes and the calcicole plants of the sea dunes. The intricate problem of these calcifuge and calcicole plants is examined from different points of view and the great importance of the antagonism between the salts of univalent and bivalent metals in this problem is proved. Some observations are also reported about the transpiration of the halophytes in the saltmarshes.—Finally the difference between the flora of diluvial and alluvial soils in the Netherlands is dealt with, which difference is always marked, although the physical and chemical properties may be nearly the same.—*Th. Weevers.*

3473. Wherry, Edgar T. **The soil reactions of Spiranthes cernua and its relatives** Rhodora **23**: 127–129. 1921.—The unusually wide range of *Spiranthes cernua* previously reported [see Bot. Absts. 10, Entry 967] as from specific acidity 300 to 3, with optimum at 30, was puzzling to the author until publication of Ames' recent article, Notes on New England Orchids,—I. Spiranthes [see Bot. Absts. 10, Entry 816], when it became apparent that the situation was due to the fact that *S. cernua* var. *ochroleuca* had not been distinguished from the typical form. In discussing the same paper the author protests against reducing *S. odorata* to varietal rank and puts forward evidence adduced from differences in habitat, soil reactions, habit, and morphology which he claims are sufficient to keep the 2 forms specifically separated.—*James P. Poole.*

STRUCTURE AND BEHAVIOR

3474. Anonymous. Puncture plant protection. Sci. Amer. 125: 183. *2 fig.* 1921.—This article describes the seed dissemination of *Tribulus terrestris*, a weed introduced and acclimated in sections of Arizona and California and which has recently been introduced into Kansas, Arkansas, Nebraska, Texas, Iowa, Indiana, and Illinois, largely through the automobile. —*Chas. H. Otis.*

3475. Bijl, P. A. van der. **Additional host-plants of Loranthaceae occurring around Durban.** South African Jour. Sci. 17: 185–186. 1921.

3476. Blake, J. E. H. **Coiling of the underground shoots of Convolvulus arvensis.** Nature 107: 747. *1 fig.* 1921.—Aerial shoots are often found coiled before reaching the surface. No object was found enclosed in the coils. Similar cases are sometimes found in *Carduus arvensis.*—*O. A. Stevens.*

3477. Christy, M. **Hieracium aurantiacum L.: a case of protective colouration.** Jour. Botany 59: 288–289. 1921.—Observations are reported on the golden-brown Fritillaries, butterflies showing marked preference for the rich orange-brown flowers of *Hieracium aurantiacum* in the Engadine.—*S. H. Burnham.*

3478. Cummins, H. A. **Pollination in Escallonia macrantha.** Jour. Botany 59: 111–112. 1921.—The author gives the results of observations made on insects instrumental in distributing pollen in *Escallonia macrantha.*—*Adele Lewis Grant.*

3479. Fuller, George D. **Anatomy of prairie plants.** [Rev. of: Hayden, Ada. (1) **The ecologic foliar anatomy of some plants of a prairie province in central Iowa.** Amer. Jour. Bot. 6: 69–85. *6 pl.* 1919 (see Bot. Absts. 2, Entry 978; 4, Entry 227). (2) **The ecologic subterranean anatomy of some plants of a prairie province in central Iowa.** Amer. Jour. Bot. 6: 87–105. *14 pl.* 1919 (see Bot. Absts. 2, Entry 745; 4, Entry 228).] Bot. Gaz. 69: 272. 1920.

3480. Godfery, M. J. **The fertilization of Ophrys apifera.** Jour. Botany 59: 285–287. 1921.—This is a résumé of the "case of a flower organized for cross-pollination by insects, which has been endowed with or acquired the faculty of self-fertilization, not in replacement of, but in addition to, its original capability of cross-pollination. . . . . It is not retrogression but a step in advance."—*S. H. Burnham.*

3481. Heywood, H. B. **Bees and scarlet-runner beans.** Nature 108: 147. 1921.—Flowers examined throughout the summer always showed the bases pierced by bumblebees. No pods formed during drought, but did so freely after rains began. In mid-September honeybees arriving before the bumblebees visited the flowers in the legitimate way.—*O. A. Stevens.*

3482. Jones, Frank Morton. **Pitcher plants and their moths.** Nat. Hist. 21: 296–316. *22 illus.* 1921.—This paper lists, describes, and illustrates the 3 genera and 9 species of Sarraceniaceae of America, the influence of insect-trapping plants on their insect associates, and the utilization of the pitchers as homes by certain nest-building Hymenoptera. The article describes the structure, habits, eggs, and larvae of the genus *Exyra;* also the pupae and moths.—*Albert R. Sweetser.*

3483. King, C. M. **Blooming dates of plants at Ames, Iowa, 1919, with duration of bloom.** Rept. Iowa State Hort. Soc. 54: 98–104. 1919.—This is an annual record of the blooming of plants, mostly at Ames, Iowa, for the year 1919. The earliest dates recorded are: *Trillium nivale* March 28, dandelion April 1, white birch April 2, soft maple April 7.—*L. H. Pammel.*

3484. Lowe, H. J. **Bees and scarlet-runner bean.** Nature 107: 747. 1921.—The author adds to an earlier report [see Bot. Absts. 11, Entry 129] that while 1 species of bumblebee visited the flowers in the normal way early in the season, later in the season a large species punctured the base of the flowers. The earlier flowers developed fruit, the later did not.—*O. A. Stevens.*

3485. MILLER, CHRISTY. **The flowers of Tragopogon: their times of opening and shutting.** Jour. Botany **59**: 253–257. 1921.—Observations are reported on the flowers of *Tragopogon pratense* and *T. porrifolius.*—*S. H. Burnham.*

3486. REICHE, KARL. **Die physiologische Bedeutung des anatomischen Baues der Crassulaceen. Mit einem Anhang: Zur Kenntnis von Senecio praecox DC. [The physiological significance of the anatomical structure of the Crassulaceae. Supplementary account of Senecio praecox.]** Flora **114**: 249–261. *4 fig.* 1921.—The scattered arrangement of the vascular tissues is the chief anatomical character common to the members of the Crassulaceae. It is difficult to distinguish annual rings. This may be related to the absence of periodicity in the water-balance owing to the abundant water supply in the stem tissues. The author suggests that the succulents should be regarded as "inner water-plants," *i.e.*, plants whose vascular strands are surrounded by tissues rich in water.—*Senecio praecox*, a common shrubby member of the xerophytic flora of central Mexico, is a root and stem succulent with thin broad leaves which are without hairs, scales, or varnish. The bundles are not scattered as in the Crassulaceae, but there are irregular projections into the pith and the phloem is penetrated by parenchyma. In this succulent, also, it is difficult to distinguish annual rings.—*A. G. Stokey.*

3487. ROCK, J. F. **Nectar-feeding birds of Hawaii.** Jour. Heredity **12**: 281–284. *2 fig.* 1921.—The Drepanidae of Hawaii include 35 species of birds belonging to 17 genera; the family is peculiar to Hawaii, and includes a large number of nectar-feeders which have developed characteristic long curved beaks. The latter are evidently specially adapted for obtaining nectar from tubular flowers; the most striking of the latter are the Hawaiian species of the tribe Lobelioideae, the flowers of which resemble to a remarkable degree the curved beaks of the Drepanid birds which feed upon them. The Lobelioideae belong to one of the oldest groups of plants inhabiting the archipelago, and the author looks to the ancestors of the present-day Drepanid birds, which show American relationship, as the possible agent of dispersal of the baccate Lobelioideae. Evidence of the simultaneous development of the Drepanid birds and the Lobelioideae is seen in the fact that individual variation in the length of the bill is still found in Drepanid birds of today.—*P. G. Russell.*

3488. STEVENS, O. A. **Further notes on evening flowers, panurgine and halictine bees.** Canadian Entomol. **53**: 65–69. 1921.—Further observations on *Gaura coccinea* show that its flowers open mostly during the 2 hours before sunset. Lists of flowers visited by *Agapostemon* and other bees (45 species are recorded for *A. texanus*) are given.—*O. A. Stevens.*

3489. THODAY, D. **On the behaviour during drought of leaves of two Cape species of Passerina, with some notes on their anatomy.** Ann. Botany **35**: 585–602. *13 fig.* 1921.—The structure and behavior of leaves of *Passerina filiformis* and *P. falcifolia* are described. On the upper side of the leaves are woolly grooves which become completely closed as the water-content falls at the end of the dry season. The water-content of shoots with closed leaf-grooves ranges from 25.7 to 34 per cent, while that of shoots with new growth at the end of the rainy season is about 60 per cent. Closure is attributed to cohesive forces in the outer epidermis. The deep cells of this layer have a very thick cuticle and as they contract, their lateral walls are thrown into bellows-like folds. The palisade cells may also show fine bellows-like folding. Water storage is regarded as at most a subsidiary function.—In *P. filiformis* the fibers interrupt the palisade tissue outside the bundles and spread laterally under the epidermis. In surface view the hypodermal fibers are seen wandering between the bundles, taking an irregular course and growing apically. The juvenile leaves of both species are slightly concave but not grooved and are glabrous with a waxy bloom. The stomata are not raised as in the adult, but sunken. The cotyledons are convex above and have a palisade tissue on the upper side, not on the lower side as in the juvenile and adult leaves.—*W. P. Thompson.*

VEGETATION

3490. Arrhenius, Olof. Species and area. Jour. Ecol. 9: 95–99. 1921.—A formula is given for finding the relative richness or poorness in species of a floral district. This is shown to hold within wide limits and shows that the species of an association are distributed according to the laws of probability, and that their number increases continuously as the area increases. He therefore regards the characterization of associations by "constants," that is by species which are always found in it, to be misleading since every species belonging to an association may become a "constant" if the plots considered be made large enough. Thus the scheme of Du Rietz and his concept of "constants" is regarded as lacking in accuracy and usefulness. Arrhenius regards associations as passing into each other quite continuously.—*Geo. D. Fuller.*

3491. Baudin, Louis. **Contribution à l'étude de la répartition verticale du plancton dans le Léman. [The vertical distribution of plankton in Lake Leman.]** Bull. Soc. Vaudoise Sci. Nat. **52**: 275–316. 1919.—The author investigated the seasonal variation in depth of different forms of plankton. It was found that the most favorable time to study vertical distribution of a species is when it is at or near its maximum abundance. For *Synedra* this occurs in June, being then very plentiful at the surface, and fairly abundant beyond a depth of 10 m. *Asterionella* becomes quite abundant at 10 m. depth in October, reaching its maximum development in January, when it occurs in almost equal abundance at depths of 1 m. and 25 m.; its seasonal decline is gradual, considerable numbers still occurring at a 25-m. depth in June. *Fragilaria* behaves somewhat similarly, except that after attaining its maximum in January its decline is much more abrupt. Among the Flagellates, *Dinobryon* and *Ceratium* show maximum development in waters of moderate temperature, their maximum being attained in spring,—in early May in the case of *Dinobryon*, and in June in the case of *Ceratium*. After partial cooling of the water in fall, the 2 genera often show a secondary maximum.—*Charles Drechsler.*

3492. Birge, E. A., and C. Juday. **Further limnological observations on the Finger Lakes of New York.** Bull. U. S. Bur. Fish. **37**: 209–252. 1921.—The occurrence and relative abundance of the phytoplankton, chiefly a few myxophyceae and the diatoms *Asterionella* and *Fragilaria*, are reported.—*T. C. Frye.*

3493. Cowles, H. C. **Ecology of tide lands.** [Rev. of: Oliver, F. W., in Carey, Alfred E., and F. W. Oliver. **Tidal lands: a study of shore problems.** *277 p., 29 pl., 54 fig.* Blackie & Son, Ltd.: London, 1918 (see Bot. Absts. 3, Entry 1972).] Bot. Gaz. **69**: 350–351. 1920.

3494. Delf, Ellen Marion. **Marine algae of the Cape Peninsula.** South African Jour. Nat. Hist. **3**: 53–64. *Fig. 1–4.* 1921.—In late years efforts have been made to trace the life history of seaweeds, but very little of this work has been done in South Africa. The green, brown, and red pigments have a real significance in the life of the plant; all undergo decomposition in bright sunlight, the red and brown being the more sensitive. In a pool near Camps Bay was a plant of *Gelidium cartilagineum*, well grown and just submerged; in this pool the light intensity was not more than $\frac{1}{30}$ full daylight. Another deep-water red alga, *Plocamium corallorhiza*, common on rock faces in False Bay, has been found growing at a depth of 36 feet. Other factors besides light intensity determine distribution. One of these is the power of resistance to desiccation when the tide recedes; this often leads to a more or less definite zonation. In shallow rock pools *Ulva* spp. and *Enteromorpha* sp. are common; *Codium tomentosum*, *C. Lindenbergi*, and *Caulerpa ligulata* are found only in deep pools; several species of *Cladophora* are found in mid-tide pools, for example, *C. flagelliformis*, *C. hospita*, and *C.*

Eckloni. In deeper water *Ecklonia buccinalis* and *Macrocystis pirifera* are found. A large number of other species occurring in the Cape Peninsula are enumerated and their habitat described.—*E. M. Doidge.*

3495. Endriss, W. **Das Pflanzenleben der Bithynischen Halbinsel. [The plant life of the Bithynian peninsula.]** Beih. Bot. Centralbl. II Abt. 38: 399–409. *Pl. 2.* 1921.—The plate is a geological map showing the kind and age of rock in the area. As a western extension of the highlands the peninsula is naturally a forest area for the most part. But today the coastal areas (Riviera) are not forested. The various types of vegetation are mentioned with lists of the typical plants in the different regions; the cultivated plants are included.—*L. Pace.*

3496. Fuller, George D. **Ecology of fungi.** [Rev. of: Dufrenoy, J. **Les conditions écologiques du développement des champignons parasites.—Étude de géographie botanique. [Ecological conditions in the development of parasitic fungi.—A study in plant geography.]** Bull. Trimest. Soc. Mycol. France **34**: 8–26. 1918 (see Bot. Absts. 2, Entry 900).] Bot. Gaz. **69**: 359. 1920.

3497. Fuller, George D. **Alpine vegetation of the central Andes.** [Rev. of: Hauman, Lucien. **La végétation des hautes Cordillères de Mendoza (République Argentine). [The vegetation of the high Cordilleras of Mendoza.]** An. Soc. Cien. Argentina **86**: 121–188. *18 pl., 7 fig.* 1918 (see Bot. Absts. 8, Entry 953).] Bot. Gaz. **69**: 354–356. 1920.

3498. Fuller, George D. **Sedge associations in Colorado.** [Rev. of: Ramaley, Francis. **The role of sedges in some Colorado plant communities.** Amer. Jour. Bot. **6**: 120–130. *2 fig.* 1919 (see Bot. Absts. 3, Entry 1974).] Bot. Gaz. **69**: 360. 1920.

3499. Fuller, George D. **Colorado grasslands.** [Rev. of: Ramaley, Francis. **Xerophytic grasslands at different altitudes in Colorado.** Bull. Torrey Bot. Club **46**: 37–52. *2 fig.* 1919 (see Bot. Absts. 3, Entry 1975).] Bot. Gaz. **69**: 358–359. 1920.

3500. Goor, A. C. J. van. **Die Zostera-Assoziation des holländischen Wattenmeeres. [The Zostera association of the Dutch Wattensee.]** Recueil Trav. Bot. Néerland. **18**: 103–121. 1921.—The surface of the Zostera meadows between the coasts of North Holland and Friesland, and the North Sea islands, Texel, Vlieland, and Terschelling, amount to about 15,000 hectares. The meadows of *Zostera marina* are to be found under the low water surface. In very clear water they have been observed at a depth of 11 m., in a few instances at 14 m. Near Riepel *Zostera* grows in 33 per cent and south of Wieringen in 20 per cent seawater. It has been found in as low as 10 per cent seawater in the company of *Potamogeton pectinatus* L. and *Zannichellia pedicellata* L. Further south of Zuiderzee it grows but little. The geographical distribution is further given of *Z. marina* var. *stenophylla* A. & G. and *Z. marina* var. *angustifolia* Horn. In the Zostera fields the following Florideae were found: *Polysiphonia nigrescens* (Dillw.) Grev., *P. violacea* (Roth.) Grev., *Gracilaria confervoides* (L.) Grev., *Ceramium rubrum* (Huds.) Ag., and some other species, whereas *Melobesia Lejolisii* Rosan forms small irregular whitish spots on old leaves. The Phaeophyceae are represented by but few species, especially *Ectocarpus siliculosus* (Dillw.) Lyngb., *E. confervoides* (Roth.) Le Jolis, and sometimes *E. rufulus* Kütz. Of the Chlorophyceae, species of *Cladophora* predominate.—*J. C. Th. Uphof.*

3501. Hastings, G. T. **The forest flora of Grassy Sprain Ridge.** Torreya **21**: 73–76. 1921.—A study was made of the plants on the top and upper slope of Grassy Sprain Ridge, Westchester County, New York, to determine (1) whether a new type of forest flora was developing, (2) whether any correlation existed between the herbaceous vegetation and particular species of trees. The quadrat method was followed; 41 species of trees were listed, a total of 1857 trees being counted, 37 per cent of which were oaks. *Quercus velutina* was the dominant species. The new forest will differ from the old chiefly in the loss of the chestnut, walnut, and hemlock, and in the addition of sour cherry, hackberry, and ailanthus. Hickory, white and black oak, black birch, and sugar maple will persist. The ash will become relatively more important. The locust, sumach, aspens, and gray birch will ultimately give way. No definite correlation was made out between the herbaceous vegetation and the trees.—*J. C. Nelson.*

3502. Herdman, W. A. **An intensive study of the marine plankton around the south end of the Isle of Man.—Part XI.** Proc. and Trans. Liverpool Biol. Soc. **33**: 95–105. 1919.—The author gives the results of observations over a series of years on seasonal abundance of marine plankton in the Irish Sea. Diatoms were found most abundant in May when the sea was nearly at its lowest temperature, and attained their minimum in August, the warmest month of the year. By far the greater part of the population of the diatom flora is represented by a few important genera, *Biddulphia, Coscinodiscus, Chaetoceras, Rhizoselenia, Phalassiosira, Guinardia,* and *Lauderia,* of which *Chaetoceras* and *Rhizoselenia* are most abundant, the former being the most preponderant in March, April, and May, the latter in May and June. Among the Dinoflagellata, *Ceratium tripos* is the most abundant, outnumbering all the species of *Peridinium* several times. The maximum for the Dinoflagellata occurs in July; the minimum in September, with a secondary maximum in October, followed by a regular decline by the end of the year.—*Charles Drechsler.*

3503. Herdman, W. A., Andrew Scott, and Mabel H. Lewis. **An intensive study of the marine plankton around the south end of the Isle of Man.—Part XII.** Proc. and Trans. Liverpool Biol. Soc. **34**: 176–184. 1920.—The plankton maximum was again found to come in May, the minimum in December. The diatoms taken by themselves form the usual double crested curve with a greater maximum in May, a minimum in August, and a 2nd lower maximum in November. The author notes a fair degree of correlation between periods of greatest abundance of phytoplankton and the spawning of most marine fish. In cases where the development of plankton occurs later than the spawning season, there would seem to be some risk that the larvae find no phytoplankton food, or very little.—*Charles Drechsler.*

3504. Jepson, Willis L. **The fire-type forest of the Sierra Nevada.** Intercoll. Forest. Club Ann. **1**: 7–10. 1921.—The author describes the chief species of trees with observations on the influence of fires on the distribution of each.—*Woodbridge Metcalf.*

3505. Kühnholtz-Lordat, G. **Phytogéographie génétique des dunes du golfe du Lyon. [On the genetic plant geography of the dunes of the Gulf of Lyons.]** Compt. Rend. Acad. Sci. Paris **173**: 728–730. 1921.—It is found that an association called an Agropyretum, characterized by *Agropyrum junceum,* precedes the association termed Ammophiletum, characterized by *Ammophila arenaria.* This latter association is followed by the Crucianelletum, which has as its principal representative *Crucianella maritima.*—*C. H. Farr.*

3506. Mayne, Catherine. **Report of the Edward Forbes Expedition.** Proc. and Trans. Liverpool Biol. Soc. **33**: 32–35. 1919.—Data were collected on the possible density of population of *Fucus* and *Laminaria. Fucus* was found growing at the level of half tide in great masses on the tops of rocks, attaining a length of 18 inches. Thirty-five stalks of *Fucus serratus* per square foot was found to represent a typical condition. *Fucus vesiculosus* showed, in 1 instance, 352 stalks arising from 12 bases. *Laminaria* begins to appear at the level of the lowest spring tides, increasing in density with the depth, from 6 to 8 stalks mingled with *Fucus* to 36 stalks 2 feet further down.—*Charles Drechsler.*

3507. Naumann, Einar. **Über einige besonders auffallende Hochproduktionen aus Nanoplankton im Süsswasser. [On some particularly striking cases of high production of nanoplankton in fresh water.]** Ber. Deutsch. Bot. Ges. **37**: 40–50. *Fig. 1–7.* 1919.—The author reports the following cases of unusually abundant production of plankton organisms in fresh water: *Ankistrodesmus falcatus* var. *spirilliformis,* 10,000,000 per cc.; *Dactylococcus* *infusionum*, 8,000,000 per cc.; and an undetermined green alga, 40,000,000 per cc. In each of these cases the organisms were growing in very small bodies of water containing large amounts of organic matter in solution. Although these numbers of organisms per cc. are far in excess of the greatest number previously reported, it is not believed that such cases of high production are rare. The usefulness of the haemocytometer in counting such great numbers is pointed out.—*R. M. Holman.*

3508. Olsen, Carsten. **Mosvegetationen.** [Moss vegetation.] Part V of: Petersen, Henning. **Maglemose i Grib Skov. Undersøgelser over Vegetationen paa en nordsjaellandsk Mose.** Bot. Tidsskr. **37**: 23–47. 1920.—In the study of this particular high moor, *Sphagnum* is the characteristic plant. The different varieties in order of their frequency are: *Sphagnum angustifolium* C. Jens, *S. rubellum* Wils, *S. apiculatum* H. Lindb., *S. magellanicum* Brid., *S. acutifolium* Ehrh., *S. palustre*, *S. cuspidatum* Ehrh., *S. imbricatum* Hornsch, *S. fuscum* (Schimp.) Klinggr, *S. fimbriatum* Wils, *S. Russowii*. Warnst. To determine the extent of distribution of each, Raunkiaer's statistical method was used.—There is considerable variation in the relation of the different varieties to the moisture factor. *S. cuspidatum* grows when completely submerged or partially so, while *S. acutifolium* is found above the water level. For each species there is a specific level. On the basis of the medium water level for 1914, *S. cuspidatum* was found 27 cm. below and 10 cm. above; *S. recurvum*, 3 cm. below to 38 cm. above; *S. magellanicum*, 14–53 cm. above; *S. imbricatum*, 14–63 cm. above; *S. acutifolium*, 20–80 cm. above. Naturally the submerged varieties do not form cushions, but such varieties as *S. magellanicum* and *S. palustre* have well marked cushion growths. *S. imbricatum* and *S. rubellum* are even more conspicuous in that the mound-like growths topple over and give a foothold for other varieties. In this respect *S. acutifolium* is the most outstanding, being in 1 case 60 cm. above the surface and 2 m. in diameter. In among these cushion-like growths are a large number of pore spaces.—In this high-moor are other species of mosses such as *Hylocomium Schreberi*, *H. splendens*, and *Hypnum cupressiforme*. The largest number of these mosses is found in the northern part where the habitat is drier. Usually they are found growing under the heath. *Hypnum cupressiforme* is often seen as an epiphyte upon birch logs. *Hylocomium* is rather evenly distributed over the entire moor. Here and there in the northern portion are found small mounds of *Leucobryum glaucum*, which extends far up into the birch woods. *Polytrichum commune* grows abundantly along the edge upon the comparatively high areas, free from heath. Under the large birch trees are found *Webera nutans, Georgia pellucida, Aulacomnium androgynum*, and *Jungermannia ventricosa*.—*A. L. Bakke.*

3509. Pearsall, W. H. **The development of vegetation in the English lakes, considered in relation to the general evolution of glacial lakes and rock basins.** Proc. Roy. Soc. London B. **92**: 259–284. 1921.—These rock basin lakes of glacial origin can be arranged in a series indicating respective degrees of development. The principal criterion is erosion within given drainage basins and resultant silting of lakes. As contrasted with the primitive lakes the evolved ones show (1) higher percentage of drainage system cultivable, (2) smaller percentage of rocky shore above 9 m. depth, (3) less *Isoetes*, *Nitella*, and *Juncus fluitans*, (4) more *Potamogeton* and *Naias*, (5) diatoms instead of desmids, (6) perch and pike instead of trout, (7) rapid decay of organic remains. Evidence is presented connecting biological differences with physico-chemical conditions which can be traced to physiographic change.—*Paul B. Sears.*

3510. Salisbury, E. J., and A. G. Tansley. **The Durmast oak-woods (Querceta sessiliflorae) of the Silurian and Malvernian strata near Malvern.** Jour. Ecol. **9**: 19–38. *Pl. 1.* 1921.—This study shows both by chemical analyses and by an examination of the vegetation that the assumption that calcareous rocks give rise to calcareous soils is often an erroneous one. *Quercus sessiliflora* is usually found on siliceous soil and yet in the areas under consideration it occurs over calcareous surface strata. Careful examination, accompanied by analyses, shows that leaching greatly reduces the calcium content of the surface soils, at times even to the extent of producing soil that requires the application of lime to give any fair amount of agricultural fertility. There are also indications that the original succession may have included a pioneer forest of *Fraxinus*, a calcicole, followed by the more silicolous forest dominated by *Q. sessiliflora*. It is also shown that the common practice of coppicing tends to decrease the acidity of the substratum.—*Geo. D. Fuller*.

3511. Sampson, Homer C. An ecological survey of the prairie vegetation of Illinois. Bull. Illinois Nat. Hist. Surv. **13**: 523–577. *Pl. 48–77.* 1921.—The purpose of the survey was to determine "the composition and ecological relation of the prairie vegetation of Illinois." "The importance of temperature and the ratio of rainfall to evaporation in determining the boundaries of prairie vegetation is emphasized. Climate alone is not the determining factor in the occurrence of prairie vegetation. Edaphic factors and the difficulty of forest vegetation establishing itself must be taken into account." Climatic factors are important in determining the general boundaries of distribution of the prairie while edaphic factors are important in determining the origin and character of the prairie associations within these boundaries. The location of the existing virgin prairies of the state is given. Railroad rights-of-way, old line-fences, and roadways were important in revealing undisturbed prairie vegetation in many sections in the upland prairie regions where cultivation had eliminated virgin tracts. The origin of the prairie habitats in relation to the geological history of the state is presented. Following glaciation the moraines in general became forested while the post-glacial lakes and swamps, slowly drained, became prairies. Post-glacial drainage followed by erosion gave forest vegetation a chance to establish itself along the principal water courses. Outwash from the Wisconsin glaciers gave rise to enormous sand areas and sand dunes in the northern half of the state. "There is some evidence that the sand prairies and some of the upland prairie region of the state date back to an arid post-glacial period during which there was an eastward extension of the prairie and plains flora. The conifer zone following the retreat of the glacier is thought to have been succeeded immediately by a xerophytic prairie flora extending as far eastward as Ohio. Subsequent increase in humidity in the Mississippi valley was then followed by a western migration of a more mesophytic prairie flora." Two distinct groups of associations resulted: the hydrarch successions found on flood plains, in morainal depressions, and on the old lake bed of Lake Chicago; and the xerarch successions found on sand and xerophytic upland glacial soils. A detailed account of the above successions is given. In the hydrarch successions, that of the river flood plains is represented by the flood-plain of the Mississippi River, south of Savanna. Diagrammatic representations of the associations together with numerous plates are presented to illustrate the successions here and on other rivers. The hydrarch succession on the old lake bed of Lake Chicago is similarly treated. A summary of the hydrarch succession in the morainal depressions shows the same relation of species as on the river flood plains. From swamp to prairie the species are *Scirpus fluviatilis, Carex vesicaria* (and other *Carex* species), *Spartina Michauxiana, Calamagrostis canadensis, Panicum virgatum,* and *Andropogon furcatus*. The effect on these successions brought about by grazing and cultivation is also represented in some of the diagrams. In the xerarch succession on upland glacial soils it was found that the *Andropogon furcatus* association always terminated the hydrarch successions. *Andropogon furcatus* is regarded as the climax grass of the whole upland prairie region and in the successions leading to this climax from the more xerophytic uplands and exposed clay soils *Andropogon scoparius* is the most important species. The forests working back from the water courses gradually invaded these upland prairie soils. The xerarch succession on sand is not treated in as much detail as the other succession on account of the previous work of Gleason on this subject. A detailed account of the species represented in the various associations is presented. A discussion of the relation of prairie and forest is included. Methods of the invasion of the forests on the prairie region are noted. A very full annotated list of species, grouped in families, indicating the associations in which they occur, is given in tabular form. A non-technical summary for the general public is presented. A bibliography is appended.—*H. W. Anderson*.

3512. Thomas, H. Hamshaw. **Some observations on plants in the Libyan desert.** Jour. Ecol. 9: 75–89. *1 pl., 1 fig.* 1921.—This is a report of observations made from a military camp near Wardan, 40 km. northwest of Cairo. Here the average annual rainfall is about 25 mm., almost all coming during the first 4 months of the year. The temperature is usually high with a recorded maximum of 115°F. within a tent during a sandstorm in April. The gravelly desert is one of the most barren spots in the world. Only 8 species are listed, 2 of which are termed frequent and are seen near the close of the rainy period in March and April. They are a bulbous liliaceous plant, *Dipcadi erythraeum,* and a geraniaceous plant of rosette habit, *Monsonia nivea.* Both are ephemeral, the aerial portions enduring for a few days only. A small lichen upon a pebble is recorded. After the moist period it was possible to travel for miles without seeing a single plant. Upon the sand-covered alluvium and upon the transition from the gravelly desert, the vegetation was slightly more abundant and included 2 or 3 grasses and shrubby plants such as *Convolvulus lanatus, Calligonum comosum, Tamarix mannifera,* and *Heliotropium luteum.* Some notes on the destructive effects of sandstorms are recorded and a few root systems are described. The well developed taproot predominates.—*Geo. D. Fuller.*

3513. Thompson, W. P. **A botanical trip through German South-West Africa.** Canadian Field Nat. 35: 74–75. 1921.—The few xerophytic plants found in the desert regions where *Tumboa mirabilis* grows are briefly described together with notes on their habits and habitats. —*W. H. Emig.*

3514. Uphof, J. C. Th. **Die Waldflora im Staate Washington. [The forest flora of the state of Washington.]** Vegetationsbilder 13: 1–5. *Pl. 37–42.* 1920.—A short description is given of the climate and geology of Washington. There is a table of the principal forest trees containing the diameter and length of the stem and the highest age attained, which is followed by a table of the acreage of the national forests of Washington. The forest trees are divided over (1) Upper Sonoran Area, (2) Transition Area, (3) Arid Transition Area, (4) Canadian Zone, (5) Hudsonian Zone, whereas the Arctic Area is left out of consideration, being deprived of forests. The plates contain a forest of *Thuja plicate* in the Olympic Mountains, a forest of *Larix occidentalis* in the Cascade Mountains, a mixed forest near Mount Rainier, a mixed forest in the Cascade Mountains, a forest of *Pinus ponderosa* near the Columbia River, and a mixed forest in the Cascade Mountains.—*J. C. Th. Uphof.*

3515. Uphof, J. C. Th. **Vegetationsbilder aus dem Staate Michigan. [Vegetation views from the state of Michigan.]** Vegetationsbilder 13: 1–5. *Pl. 43–48.* 1921.—At first a general account of the climate and geology is given which is followed by a short description of the flora in the principal parts of Michigan. The plates contain: a mixed forest in southern Michigan; a mixed forest near Lansing; a young forest near Mason; a forest of *Pinus Strobus* near Lake Higgins; *Pinus resinosa* near Lake Michigan; *Tsuga canadensis* near Lake Huron; *Sarracenia purpurea* near Lansing; sand dunes along Lake Michigan.—*J. C. Th. Uphof.*

3516. Wiinstedt, K. **Om Vegetationen paa Sejrø. [The vegetation of Sejro.]** Bot. Tidsskr. 37: 83–106. 1920.—This island, first visited by S. A. Steinberger in 1843, has a flora of about 400 species from which many species found in other parts of Denmark are absent. It consists of 2 distinct parts, drift and alluvium, the former having the older flora, that on the alluvium being introduced by the aid of wind, water, animals, and man. Forest is absent with the exception of a grove of planted conifers near Mastrup. The vegetation of the hills, bluffs, strand, bogs, and ponds is described and lists of species given.—*A. L. Bakke.*

FLORISTICS

3517. Anonymous. **A possible ancient migration of useful plants westward in Asia.** Gardens' Bull. Straits Settlements 2: 444. 1921.—After referring to conclusions arrived at with regard to migration by water westward in Asia, the suggestion is made that one of the waves reaching Ceylon and South India from Malaya might have carried the coconut with it.—*I. H. Burkill.*

3518. Anonymous. **Additions to the wild fauna and flora of the Royal Botanic Gardens, Kew: XV.** Kew Bull. 1920: 212–217. 1920.

3519. Anonymous. **The origin of the coco-nut palm.** Agric. News [Barbados] **20**: 209–211. 1921.—The divergent views of O. F. Cook and O. Beccari are discussed; the former considers America the palm's original home, the latter, Asia.—*J. S. Dash.*

3520. Almquist, Erik. **Växtgeografiska bidrag. 2. Norrbotten. [Phytogeographic contributions. 2. Norrbotten (northernmost province of Sweden).]** Bot. Notiser **1920**: 127–133. 1920.—A list of 116 species with localities and notes is given. As an appendix there is a list of 23 adventive species found at Karungi in 1915. Karungi was the terminal of the Swedish northern trunkline railroad, and over it went the enormous transit traffic to Finland and hence to Russia during the first part of the World War.—*P. A. Rydberg.*

3521. Almquist, Erik. **Växtgeografiska bidrag. 3. Jämtland. [Phytogeographic contributions. 3. Jämtland (a province in northern Sweden).]** Bot. Notiser **1920**: 213–214. 1920.—New localities for 35 of the rarer plants are given.—*P. A. Rydberg.*

3522. Anderson, J. P. **Supplementary list of plants from southeastern Alaska.** Proc. Iowa Acad. Sci. **26**: 327–331. 1919.

3523. Anthony, H. E. **From humid forest to snow-capped height in Ecuador.** Nat. Hist. **21**: 459–473. *Pl. 13.* 1921.—While this paper is concerned with the physiography and natural history of the region, considerable attention is devoted to the botanical features. The paper is illustrated with excellent half-tones.—*Albert R. Sweetser.*

3524. Beguinot, Augusto. **Viaggio di Leonardo Fea nell'Africa occidentale. Contributo alla flora delle isole del Capo Verde e notizie sulle sua affinità ed origine. [Contribution to the flora of the Cape Verde Islands.]** Ann. Mus. Civico Storia Nat. Genova **III, 8**: 9–73. 1918–1920.—In addition to an enumeration of the plants collected by Fea, the history of previous botanical exploration in the islands is given, followed by a discussion of the relationships and origin of the species found.—*Edith K. Cash.*

3525. Bews, J. W. **The flora of Natal and Zululand.** *vi + 248 p.* City Printing Works: Pietermaritzburg, Natal, 1921.—This is a list of the Natal and Zululand flora with keys to families and genera.—*E. P. Phillips.*

3526. Bornmuller, J. **Kleiner Beitrag zur Kenntnis der Flora des Steppengebiets am oberen Euphrat sowie Nord-Syriens. [A small contribution to the knowledge of the flora of the steppes and the upper Euphrates and North Syria.]** Beih. Bot. Centralbl. II Abt. **38**: 431–457. *Pl. 3.* 1921.—Thirty-two families are listed with from 1 to 17 species in each.—*L. Pace.*

3527. Bradshaw, R. V. **Cynosurus echinatus in Oregon.** Torreya **21**: 81–83. 1921.—*Cynosurus echinatus* L. was found in June, 1919, on the dry slope of Skinner's Butte, Eugene, Oregon, and has since become thoroughly established. It has also been found on Spencer's Butte, 6 miles south of Eugene. It has been previously reported from British Columbia by J. K. Henry and from California by Alice Eastwood. No specimens from the U. S. A. are found in the Gray Herbarium or that of the New York Botanical Garden. The species differs from *C. cristatus* chiefly in its long prickly awns and compact panicles.—*J. C. Nelson.*

3528. Bradshaw, R. V. **Notes on Oregon plants.** Amer. Bot. **27**: 126–128. 1921.—Among the plants rarely found in Oregon are the red alga, *Lemanea fucina rigida, Anthriscus Anthriscus, Cogswellia microcarpa, Scandix pecten-veneris, Mimulus cardinalis,* and *Ceanothus cuneatus.*—*S. P. Nichols.*

3529. Bradshaw, R. V. Oregon willows. Amer. Bot. 27: 56–59. 1921.—A statement of the species found at Eugene, Oregon, is given.—*S. P. Nichols.*

3530. Clute, W. N. Midsummer flora of Tuba Oasis. Amer. Bot. 27: 41–47. 1921.—A description of the oasis and a list of the plant species are given.—*S. P. Nichols.*

3531. Clute, W. N. Midsummer flora of Tuba Oasis. Amer. Bot. 27: 101–104. 1921.

3532. Constantin, J. Sur la biologie alpestre. [On alpine biology.] Compt. Rend. Acad. Sci. Paris 173: 537–540. 1921.—Notes are given on a trip through the Alps of Vanoise. An alpine variety of *Pleurotus Eryngii* was found. Other fungi are reported to show nanism.—*C. H. Farr.*

3533. Diehl, Wm. W. **The flora of the Ledges.** Rept. Iowa State Bd. Conservation **1919**: 122. 1920.—The author gives a list of plants on the Carboniferous sandstone such as *Polypodium vulgare, Camptosorus rhizophyllus, Mitella diphylla, Prunus pennsylvanica, Dirca palustris, Rhamnus lanceolata.*—*L. H. Pammel.*

3534. Druce, G. Claridge. **Matricaria suaveolens Pursh, in Britain.** Gard. Chron. **69**: 187–188. 1921.—This plant is of North American origin and not identical with *Matricaria suaveolens* Linn., which Richter regards as a synonym of *Anthemis nobilis*. It was first found in England by J. G. Baker in 1871. Additional collections up to 1920 showing its rapid spread are noted.—*P. L. Ricker.*

3535. Dupret, H. **Notes upon the Drepanocladi of the vicinity of Montreal, Quebec, Canada.** Bryologist **24**: 36–39. 1921.—The Drepanocladi of the vicinity of Montreal are grouped by the author under 6 major species, with numerous varieties and forms. There are short notes upon the gross appearance of each group mentioned, with some mention of the special habitat preferences.—*E. B. Chamberlain.*

3536. Ekblaw, W. Elmer. **Plant life of northwest Greenland.** Nat. Hist. **19**: 272–291. *20 pl.* 1919.—There have been described 120 species flowering in the short 2-months season. Of these the writer describes and photographs many both as individuals and in their environment, including *Agaricus campestris.*—*Albert R. Sweetser.*

3537. Eyles, F. **Constituents of the flora of southern Rhodesia.** South African Jour. Sci. **17**: 181–184. 1921.—Speaking generally, southern Rhodesia belongs to the great Central African Plateau, with an altitude of 3,000–5,000 feet and an annual rainfall of 15–40 inches. The partial analysis of the flora shows that 70 per cent of the whole flora is comprised within 20 families, the remaining 30 per cent being spread over no less than 122 families. Gymnosperms are represented by only 2 species, and the proportion of monocotyledons and dicotyledons is as 1: 3.84. There can be little doubt that the southern and western districts will be found to have close affinity with the northern parts of the Union, and particularly with the region sometimes spoken of as the Kalahari, while the northern one will be found closely related to the Central African flora, and the eastern coast-belt nearly akin to the south-east coast region of the Union.—*E. P. Phillips.*

3538. Fiester, Mrs. Charles. **The wild flowers of Iowa.** Rept. Iowa State Hort. Soc. **54**: 233–236. 1919.—Popular.—*L. H. Pammel.*

3539. Fisher, G. Clyde. **A station for the Ram's-Head Lady's-Slipper.** Torreya **21**: 63–64. 1921.—Recently a colony of 50 or more plants of *Cypripedium arietinum* R. Br. was discovered by P. D. Fagans near Westport-on-Lake Champlain, New York, in a hillside woods near the lake beach.—*J. C. Nelson.*

3540. Fitzpatrick, T. J. **The fern flora of Nebraska.** Proc. Iowa Acad. Sci. **26**: 311-326. 1919.—The article outlines the ecologic regions of the state and gives a list of 26 species. The known localities for each are listed.—*H. S. Conard.*

3541. Fruhstorfer, H. **Tessiner Wanderbilder: III. Der Monte Salvatore. (Mit orthopterologischen, malacologischen und herpetologischen Mitteilungen.) [Ticinian travel pictures: III. Monte Salvatore. (With orthopterological, malacological, and herpetological contributions.)]** Arch. Naturgesch. Abt. A **86**: 104-113. 1920 [1921].—Notes are included of the plants observed at various altitudes.—*C. E. Allen.*

3542. Fuller, George D. **Montane plants of the Rocky Mountains.** [Rev. of: Rydberg, P. A. **Phytogeographical notes on the Rocky Mountain region. VIII. Distribution of the montane plants.** Bull. Torrey Bot. Club **46**: 295-327. 1919 (see Bot. Absts. 4, Entry 364).] Bot. Gaz. **69**: 360. 1920.

3543. Guppy, H. B. **The testimony of the endemic species of the Canary Islands in favour of the age and area theory of Dr. Willis.** Ann. Botany **35**: 513-522. 1921.—The number of species confined to the Canary Islands is about 400. The number of species found in the Canaries and other islands of the Macaronesian floral region (Azores, Madeiras, and Cape Verde Islands) but confined to the Macaronesian region is about 50. A list of the latter is given. Tables are also given showing the number of species of both these groups confined to 1, 2, 3, etc., islands of the Canaries. Whereas only 10 per cent of the Macaronesian endemics are confined to 1 island, between 60 and 65 per cent of the Canarian endemics are known from only a single island. Evidence is given to show that the widely distributed Macaronesian endemics are the remains of an ancient continental flora, while the Canarian endemics are young species in early stages of spreading. The role of highly variable, widely ranging species in the production of new forms is emphasized and illustrated.—*W. P. Thompson.*

3544. Harlan, E. R. **The Red Rock region.** Rept. Iowa State Bd. Conservation **1919**: 160-162. 1920.—This article gives an account of the redrock sandstone of the region and its relation to plant life.—*L. H. Pammel.*

3545. Henning, Carl F. **The Ledges, nature's gift to Iowa.** Rept. Iowa State Bd. Conservation **1919**: 116-121. 1920.—This is a running account of the plants of the Ledges in Boone County and of the coal measure sandstone, as well as of the animal life.—*L. H. Pammel.*

3546. Henrard, J. Th., P. Jansen, W. H. Wachter, en A. W. Kloos, Jr. **Over de flora van Zuid-Limburg en een harer pioniers. [On the flora of Southern Limburg and one of its pioneers.]** Levende Natuur **26**: 81-83. 1921.—A general and popular consideration is given of the flora of southern Limburg, Netherlands.—*J. C. Th. Uphof.*

3547. Hunnewell, Francis W. **An extended range for Amelanchier amabilis.** Rhodora **23**: 71-72. 1921.—A new station for this species is reported at Cooperstown, Otsego County, New York. The species has not before been reported east of Ithaca, New York.—*James P. Poole.*

3548. Lange, Axel. **Vegetationen paa Tunø og Hjelm. [Vegetation of Tunø and Hjelm.]** Bot. Tidsskr. **37**: 1-22. 1920.—During the summer of 1917 an investigation was made of the flora of 2 small islands about 3 mile from Sanso and accessible by motor boat from Aarhus. A description of the physiographic features of the islands with their plants is given. For the entire island of Tuno 412 species are listed; for Hjelm, 115 species. Seventeen species found upon Hjelm are not present on Tuno. According to various historical accounts these islands were at one time heavily timbered.—*A. L. Bakke.*

3549. Lazell, Fred J. **The palisades of the Cedar River.** Rept. Iowa State Bd. Conservation 1919: 95–98. 1920.—The author describes the Palisades as similar in appearance to those of the Hudson. The cliffs are of the upper Silurian dolomite. He records *Viburnum dentatum, Polypodium vulgare, Cystopteris fragilis, C. bulbifera, Woodsia obtusa,* and *Asplenium angustifolium* on the rocks, and in shady ravines, *Hydrophyllum virginianum* and *H. appendiculatum.—L. H. Pammel.*

3550. Lees, James H. **Supplementary report of the Devil's Backbone.** Rept. Iowa State Bd. Conservation 1919: 45–46. 1920.—An account is given of the rock formation. The somewhat rare plants for Iowa, *Pinus Strobus* and *Taxus canadensis,* are mentioned.—*L. H. Pammel.*

3551. Lutz, F. E. **Geographic average, a suggested method for the study of distribution.** Amer. Mus. Novitates 5. *7 p.* 1921.—This is a method which appears to give the best promise of obtaining a concrete expression of an area. The geographical average is the average of the limits of distribution in latitude and longitude. As an example, the plants of Britton and Brown, Illustrated Flora, Vol. 2 (Portulacaceae to Papilionaceae), are so determined. Those occurring in the following regions have the distribution given:

	GEOGRAPHIC AVERAGE		AVERAGE RANGE	
	Lat.	Long.	Lat.	Long.
Labrador	51°	89°	20°	79°
Newfoundland	48°	87°	20°	70°
Nova Scotia and New Brunswick	45°	87°	19°	56°
New England	42°	85°	17°	44°
Maryland, Virginia, and Delaware	39°	85°	14°	26°

This shows a narrower range in both latitude and longitude for the plants of more southern regions. In further discussion of the data, the plants of the different regions are separated as to northward and southward extensions of range and similar differences are found in these groups. The data yield the following provisional latitudinal averages for the life zones of Merriam: Arctic, more than 52°; Hudsonian, 48° or 49°; Canadian, 44° or 45°; Alleghanian, 41° or 42°; Carolinian, 38° or 39°; Austroriparian, less than 34°. Corrections for altitude are not yet worked out. The mean of the geographical average of the plants of a particular association would give a value for the association as a whole.—*O. A. Stevens.*

3552. Martin, W. **Unrecorded plant habitats for the eastern botanical district of the South Island of New Zealand.** Trans. and Proc. New Zealand Inst. 53: 383–385. 1921.—Sixty-seven spermatophytes and ferns are listed as new or rare in this district.—*Wm. Randolph Taylor.*

3553. Merrill, E. D. **A bibliographic enumeration of Bornean plants.** Jour. Roy. Asiatic Soc. Straits Branch. Special number. *637 p.* 1921.—The enumeration closes with the end of 1917. It contains 4937 species of phanerogams; cryptogams are not included. In an introduction the author calls attention to the distribution of about 135 species as common to and confined within Borneo, the Malay Peninsula, and Sumatra, and to the smaller number, about 60 species, common to and confined within Borneo and the Philippine Islands. He notes that the Asiatic element is smaller in Borneo than in Java, and gives an account of the Australian element in Borneo, which, though found chiefly on the high mountains, is nevertheless present in the mangrove forests upon the coasts; it is less developed in Borneo than in the Philippines. The specific endemism he calculates at about 40 per cent, against 60 per cent in the Philippine Islands and 50 per cent in the Malay Peninsula; but there are conspicuously more endemic genera in Borneo than in the Philippine Islands.—*I. H. Burkill.*

3554. Moxley, George L. **An excursion in the San Gabriels.** Amer. Bot. 27: 134–138. 1921.

3555. Paige, F. W., and F. E. Drake. **Wild Cat Cave and Woodman's Hollow.** Rept. Iowa State Bd. Conservation 1919: 91–92. 1920.—*Asplenium Filix-foemina, Osmunda Claytoniana, Dryopteris Goldiana,* and *Camptosorus rhizophyllus* are listed.—*L. H. Pammel.*

3556. Pammel, L. H. **Bixby Park, Clayton County.** Rept. Iowa State Bd. Conservation 1919: 144–146. 1920.—An interesting area for a valley-prairie region is found in Clayton county, where there is a narrow limestone escarpment and an ice cave. Among plants noted are *Cystopteris fragilis, C. bulbifera, Adiantum pedatum, Woodsia obtusa, Lonicera Sullivantii, L. glauca, Taxus canadensis.*—*L. H. Pammel.*

3557. Pammel, L. H. **Botany of the Devils Backbone area in Madison County.** Rept. Iowa State Bd. Conservation 1919: 166–167. 1920.—This paper should be considered in connection with the paper by J. H. Lees [see Bot. Absts. 11, Entry 3550] on the geology. The area is a typical prairie on a narrow ridge. *Lespedeza violacea, Psoralea lanceolata,* and *Scutellaria parvula* are noted; and adjacent to the prairie, *Quercus alba, Q. rubra, Q. acuminata, Q. velutina, Ulmus racemosa, U. fulva, U. americana, Fraxinus americana,* and *Tilia americana.*—*L. H. Pammel.*

3558. Pammel, L. H. **Flora of Jackson and Dubuque Counties.** Rept. Iowa State Bd. Conservation 1919: 79–81. 1920.—The author gives a running account of the plants of the region, noting *Quercus macrocarpa, Q. velutina, Q. rubra, Q. alba, Q. ellipsoidalis, Q. palustris, Q. acuminata, Fraxinus americana, Rhamnus lanceolata, Platanus occidentalis, Tilia americana, Asimina triloba,* and the American lotus. The papaw is native at Dubuque and is reported as far north as McGregor, where it was probably planted by Indians.—*L. H. Pammel.*

3559. Pammel, L. H. **Flora of the bogs of Cerro Gordo and Worth Counties.** Rept. Iowa State Bd. Conservation 1919: 171. 1920.—Not so long ago these bogs were lakes. The present flora is a typical boreal bog flora. Among the plants noted are *Cirsium muticum, Salix candida, S. Richardsonii, S. discolor, Cicuta bulbifera, Bidens Beckii, Gentiana crinita, Bromus Kalmii,* and *Populus tremuloides.* There is, however, no sphagnum as in the Wisconsin and Minnesota peat bogs. A species of *Hypnum* is common.—*L. H. Pammel.*

3560. Pammel, L. H. **Forest flora of Hardin County.** Rept. Iowa State Bd. Conservation 1919: 113–115. 1920.—The occurrence of *Pinus Strobus, Betula papyrifera,* and *B. lutea* is noted. This is the most outlying distribution of the white pine west of the Mississippi River with the exception of Muscatine County. The flora associated with the white pine and birch includes *Phegopteris Dryopteris, Aspidium marginale, Cypripedium spectabile, Cornus circinata,* and *Diervilla trifida.*—*L. H. Pammel.*

3561. Pammel, L. H. **Forest trees and shrubs in Boone County.** Rept. Iowa State Bd. Conservation 1919: 121. 1920.—An account is given of the trees of the Ledges including *Ulmus fulva, U. americana, U. racemosa, Quercus rubra, Q. alba, Q. acuminata, Q. macrocarpa, Juglans cinerea, Ostrya virginiana, Carpinus caroliniana.*—*L. H. Pammel.*

3562. Pammel, L. H. **Reindeer lichens at the Ledges.** Rept. Iowa State Bd. Conservation 1919: 116. 1920.—Note is made of the occurrence of the reindeer lichen on the Carboniferous sandstone at the Ledges.—*L. H. Pammel.*

3563. Pammel, L. H. **Report on Wild Cat Den.** Rept. Iowa State Bd. Conservation 1919: 72–76. 1920.—A list is given of the rare plants found on the Carboniferous sandstone in the Pine Creek region, such as *Trillium sessile, T. grandiflorum, Maianthemum canadense, Aster macrophyllus, Rhexia virginica* (found in the vicinity), *Symplocarpus foetidus, Pentstemon* *grandiflorus* (sandy soil, Muscatine Island), *Gaylussacia baccata, Lespedeza violacea, L. reticulata, Aspidium Goldianum, A. spinulosum, A. acrostichoides, Circaea alpina, Lycopodium lucidulum, L. complanatum*, and *Phegopteris polypodioides.—L. H. Pammel.*

3564. Pammel, L. H. **The barberry in Iowa and adjacent states.** Proc. Iowa Acad. Sci. 26: 193–237. 1919.—This article gives the history of the early plantings of barberry species in Iowa. The author finds that "it is impossible for one to determine the age of the common barberry from the annual rings." Twenty-two localities are described where barberry grows wild.—*H. S. Conard.*

3565. Pammel, L. H. **The loess area of Western Iowa.** Rept. Iowa State Bd. Conservation **1919**: 55–57. 1920.—The paper gives a list of the characteristic flora of the loess: *Lygodesmia juncea, Aplopappus spinulosus, Dalea laxiflora, Oxytropis Lamberti, Liatris punctata, Yucca glauca, Sporobolus cuspidatus, Salvia lanceolata, Petalostemon multiflorus, Euphorbia Geyeri, E. marginata, Helianthus Maximiliani, Glycyrrhiza lepidota, Callirhoe involucrata, Gaura coccinea, Cirsium canescens.—L. H. Pammel.*

3566. Pammel, L. H. **The lower Des Moines area.** Rept. Iowa State Bd. Conservation **1919**: 65–69. 1920.—An account is given of the trees embracing the area between Keosauqua and Croton, Iowa, on the Des Moines River. The following species of oaks are given for Keosauqua: *Quercus palustris, Q. ellipsoidalis, Q. velutina, Q. rubra, Q. alba, Q. platanoides, Q. acuminata*, and *Q. macrocarpa*. Reference is made to the soils and to the plants found associated with various soils.—*L. H. Pammel.*

3567. Pammel, L. H. **The Monkey Mountain area near Ottumwa.** Rept. Iowa State Bd. Conservation **1919**: 152. 1910.—This contains a brief list of plants found on the Carboniferous sandstone near Ottumwa. It is not unlike the flora found on similar rock types.—*L. H. Pammel.*

3568. Pammel, L. H. **Woodman's Hollow and Wild Cat Den.** Rept. Iowa State Bd. Conservation **1919**: 87–89. 1920.—Many interesting plants are listed, common names only being given. The Carboniferous sandstone is inhabited by the alternate leaved dogwood, silky cornel, walking leaf and the ostrich ferns.—*L. H. Pammel.*

3569. Pammel, L. H. **Yellow River region in Allamakee County.** Rept. Iowa State Bd. Conservation **1919**: 163. 1920.—This paper describes a stretch of Balsam fir woods (*Abies balsamea*) on the north slope of the Yellow River, with associated plants: *Corylus rostrata, Pinus Strobus, Betula papyrifera, Poa nemoralis, Aconitum uncinatum, Taxus canadensis, Sambucus racemosa, Arabis lyrata, Circaea alpina, Viola blanda, Phegopteris calcarea.—L. H. Pammel.*

3570. Peck, M. E. **Study of a section of the Oregon coast flora.** Proc. Iowa Acad. Sci. **26**: 337–362. 1919.—This paper gives an ecologic study of the flora of a coastal area in Lincoln County, between Yaquina Head and Yachats River, with a list of species collected, and habitats.—*H. S. Conard.*

3571. Phillips, E. P., and J. J. Kotze. **The occurrence of "Terblanz" (Faurea Macnaughtonii) in Natal and Pondoland.** South African Jour. Sci. **17**: 221. 1921.—The Knysna "Terblanz" appears in the Knysna forest, then appears in the Pondoland forests, and reappears in the Ngomi forest in Northern Natal.—*E. P. Phillips.*

3572. Poppelwell, D. L. **Notes on the indigenous vegetation of Ben Lomond, with a list of species.** Trans. and Proc. New Zealand Inst. **52**: 248–252. 1920.—Ben Lomond is a locality in the neighborhood of Queenstown frequently visited by botanists, but of which no list of plants has previously been published. In this article there are listed 25 pteridophytes, 3 taxads, 17 monocots, and 119 dicots, with their habitats and relative frequency of occurrence.—*Wm. Randolph Taylor.*

3573. Poppelwell, D. L. **Notes on the indigenous vegetation of the north-eastern portion of the Hokonui Hills, with a list of species.** Trans. and Proc. New Zealand Inst. **52**: 239–247. 1920.—These hills extend from near the coast inland for about 30 miles. The area dealt with reaches an altitude of slightly over 2000 feet above sea-level, and is mainly upland cut by valleys with constant streams, though containing several acres of bush. The varied soils and situations support a large flora, the introduced plants of which are not considered in this paper. Of indigenous species and varieties, there are 39 pteridophytes, 6 taxads, 57 monocots, and 181 dicots, the relative abundance and habitat for each of which is given.—*Wm. Randolph Taylor.*

3574. Preaubert, E. **Relevé d'herborisations en Anjou de 1914 à 1917. (Flore vasculaire.) [Abstract of collections made in Anjou from 1914 to 1917. Vascular flora.]** Bull. Soc. Etudes Sci. Angers **49**: 1–14. 1920.—The author observes the invasion of the local flora by exotics, promoted especially by human agencies such as railroad traffic. This is bound to be especially true in years following the war, when it may be expected that North American species will appear around cantonments occupied by the allies of the French. Usually these exotics tend to disappear, but occasionally a species will become acclimated, or even develop into a nuisance. New locations for 54 species are recorded, as well as the occurrence of a species, *Oenanthe filipenduloides* Thuil., new to the district.—*Charles Drechsler.*

3575. Rosenvinge, L. Kolderup. **Om nogle i nyere Tid indvandrede Havalger i de danske Farvande. [Marine algae recently introduced into Danish waters.]** Bot. Tidsskr. **37**: 125–135. 1920. [With English abstract.]—Well-known examples of the migration of marine algae are recorded, such as the appearance of *Bonnemaisonia hamifera* Hariot, a Japanese species, along the southern shores of the British Isles and of the Mediterranean *Colpomenia sinuosa* (Roth) in the English Channel in 1905. Among the recent introductions into Danish waters are: (1) *Gigartina mamillosa* (G. & W.) J. Ag., reported at Thisted by I. P. Jacobsen in 1869 and by the author as abundant in 1890–93. In 1912 and in 1915 it was also found at Aarhus. (2) *Trailliella intricata* Batters was first reported by the author in 1901, in the Limfjord where it became abundant by 1912. It was first found in the Kattegat by Petersen, in 1909, and has since become abundant there although it is always sterile in Danish waters. (3) *Codium tomentosum* (Huds.) Stackh. was seen by the author at Hirsholm near Frederikshavn, in 1919, growing on wood and pebbles in the harbor. As this locality is not visited by vessels from foreign waters it is thought that it may have been introduced with the establishment of a field of mines during the war. (4) *Codium mucronatum* J. Ag., a New Zealand species, reported by Cotton, in 1912, along the coast of Ireland and Scotland, was collected by several investigators in the Limfjord in the summer of 1920, doubtless introduced by ships from more western waters.—*A. L. Bakke.*

3576. Sands, W. N. **Plants common to the West Indies and Malaya.** Agric. News [Barbados] **20**: 163, 182–183. 1921.—Although in no sense a comprehensive study, the article nevertheless gives an interesting account of the principal economic plants, flowering trees, and wild plants which the author has found from his own experience to be common to both regions.—*J. S. Dash.*

3577. Schonland, S. **Note on the Crassulaceae found in Rhodesia.** South African Jour. Sci. **17**: 186–188. 1921.—Judging by present knowledge, the number of Crassulaceae in Rhodesia is very small and reflects the general distribution. Species of *Bryophyllum* (now placed under *Kalanchoe*), *Sedum*, and *Sempervivum* are absent. *Cotyledon* is very poorly represented. There is nothing in the configuration of the country, nor in the climate, that, as far as can be judged, is in any way a hinderance to the growth of numerous Crassulaceae, and, as there is an almost complete absence of endemism, it may be permissible to conclude that at all events the Crassulas have reached the country at a comparatively recent period.—*E. P. Phillips.*

3578. Shirley, John. **A preliminary list of plants of the National Park, Macpherson Range.** Proc. Roy. Soc. Queensland **31**: 21–27. 1919.—A catalogue is given of the native plants of Queensland, collected in the National Park at an altitude of 3000–3600 feet during a 5-weeks' holiday. Two climbing plants hitherto unrecorded for Queensland are reported. No new species are described.—*J. H. Faull.*

3579. Sim, T. R. **South African fern notes, with a list of ferns and fern allies found in southern Rhodesia, and of additional species recorded for other South African phytographic areas.** South African Jour. Sci. **17**: 275–284. 1921.—The older coastal areas, *i.e.*, West, East, Kaffraria, and Natal, which were carefully worked years ago, provide very little additional material, but the inland and northern areas continue to have increasing lists of species found, and probably will do so for years as localities become more accessible, since the fern flora is richer in species in the tropics. One additional species is recorded for the whole of South Africa, *i.e.*, a small Selaginella found in Basutoland.—*E. P. Phillips.*

3580. Skotte, Harald. **Nya fyndorter för lind og lön i Ångermanland.** [New localities for linden and maple in Ångermanland (a province in northern Sweden).] Bot. Notiser **1920**: 215. 1920.—Both species were found on the mountain Lillruten, not far from the village of Magdbäcken, 5 km. northeast of Skuleberget, at 63°5′ N. latitude.—*P. A. Rydberg.*

3581. Stephenson, T., and T. A. [Stephenson.] **Orchis praetermissa Druce and O. purpurella Stephenson.** Jour. Botany **59**: 234. 1921.—New stations for the occurrence of these species in Holland are noted.—*Adele Lewis Grant.*

3582. Taylor, Norman. **Endemism in the Bahama flora.** Ann. Botany **35**: 523–532. 1921.—Of the 894 native species of flowering plants in the Bahamas, 132 are endemics. A comparison of the endemics and non-endemics in regard to degree of dispersal shows that they are not very different, the percentages confined to 1, 2, or 3 islands being about the same in the 2 cases. It is concluded in opposition to the age-and-area hypothesis that the age of the endemics cannot be measured either by their degree of dispersal or by their frequency. In spite of the youth of the islands 57 per cent of the endemics are woody while only 39 per cent of the non-endemics are woody. Evidence is adduced to show that endemism is the response of the vegetation to peculiar conditions of soil, lack of rainfall, regular trade winds, and violent hurricanes.—*W. P. Thompson.*

3583. T[urrill], W. B. **A new European plant.** Kew Bull. **1921**: 128. 1921.—This paper records the discovery on Cape Hellas, Gallipoli, of *Gonocytisus angulatus* Spach., a species previously known only in Asia Minor.—*E. Mead Wilcox.*

3584. T[urrill], W. B. **Cardamine pratensis uniflora in Britain.** Kew Bull. **1920**: 223. 1920.

3585. T[urrill], W. B. **Carex riparia var. gracilis, in Britain.** Kew Bull. **1920**: 141–142. 1920.

3586. Tuttle, Flora Mae. **Flora of Mitchell County.** Rept. Iowa State Bd. Conservation **1919**: 142–144. 1920.—This is a short account of the plants of the region. [See also following entry.]—*L. H. Pammel.*

3587. Tuttle, F[lora] M[ae]. **Flora of Mitchell County.** Proc. Iowa Acad. Sci. **26**: 269–299. 1919.—After a brief non-technical description of the terrain, the author lists 15 species of fern allies, 3 of gymnosperms, and 478 of angiosperms, with a locality for each.—*H. S. Conard.*

3588. Wall, A. **New plant stations.** Trans. and Proc. New Zealand Inst. **53**: 426–428. 1921.—Records are given for 86 phanerogams and ferns including 2 introduced species.—*Wm. Randolph Taylor.*

3589. Wall, A. **Ranunculus paucifolius T. Kirk: its distribution and ecology, and the bearing of these upon certain geological and phylogenetic problems.** Trans. and Proc. New Zealand Inst. **52**: 90–105. *Pl. 2–5.* 1920.—*Ranunculus paucifolius* T. Kirk. is closely related to *R. chordorhizos* Hook. f., differing in its more coriaceous habit, fewer and more entire leaves, longer scape and broader petals. It occurs only in the Trelissick Basin, mostly on ground that has a slope of 6°–8°. The soil is very loose and drifting debris from Tertiary limestone which, in the areas where *R. paucifolius* occurs, supports a very scant flora. Distribution of this plant and those associated with it seems to be only by drifting of the soil and the admixed seeds before the wind. The author considers that this and similar areas represent the remnants of a once extensive and rather level area of limestone beds since mostly removed by erosion. They have passed through a succession of mesophytic and xerophytic or "steppe climate" conditions which only *R. paucifolius* and a few associated species have survived. The origin of *R. paucifolius* is considered to have been by mutation previous to the xerophytic period, not by gradual adaptation to it.—*Wm. Randolph Taylor.*

3590. Ward, F. Kingdon. **On the road to Htawgaw.** Gard. Chron. **69**: 186. 1921.—This article gives general descriptions of the topographic features and floral aspects of the country through which the expedition passed.—*P. L. Ricker.*

3591. Willis, J. C. **Endemic genera of plants in their relation to others.** Ann. Botany **35**: 493–512. *6 fig.* 1921.—In answer to frequent inquiries a summary is first given of the hypothesis of "age and area" and of the evidence which has been advanced from time to time in support of it. The rest of the paper is an attempt to extend the hypothesis to endemic genera the world over, the previous work having dealt with species of restricted areas. Evidence is given to show that most endemic genera are young and in the early stages of spreading, not relics which have been exterminated elsewhere, as is commonly believed. It is pointed out that if endemic genera are survivals they should belong mainly to small families of broken distribution which are considered unsuccessful and moribund, and not to large and successful families, such as Compositae and Rubiaceae; but if they are young they should appear in families in proportions not dissimilar to the proportions of genera appearing in those families at the present time. This test is first applied to all the endemic genera of all the islands in the world. It is shown that the island endemics occur chiefly in the largest families, and in rough proportion to the actual totals of genera contained in them. The small families and those of disconnected distribution are very poorly represented. Other regions of the world are treated similarly and it is found that endemic genera appear in regular proportion to the totals of genera in the families to which they belong. It is concluded that such genera cannot be survivals but are really young and in the early stages of dispersal. It is not denied that relic endemic genera exist but it is held that they are comparatively unimportant. In a postscript it is added that further work has revealed the presence of many relics in temperate North America.—*W. P. Thompson.*

3592. Wolden, B. O. **The moss and lichen flora of western Emmet Co.** Proc. Iowa Acad. Sci. **26**: 259–267. 1919.—The author enumerates 49 species of lichens, 4 of hepatics, and 33 of bryales, with notes on the habitat of each.—*H. S. Conard.*

3593. Young, Mary Sophie. **The seed plants, ferns and fern allies of the Austin [Texas] region.** Univ. Texas Bull. 2065. *98 p.* 1920.—This publication is based on the author's own collections during 6 years and the collections in the University of Texas herbarium made by her predecessors. It consists of a list of the plants in the groups, giving family, scientific and common name, habitat, and distribution. About 730 species are listed, practically all angiosperms. In the pteridophytes and gymnosperms are 1 Ophioglossum, 1 Anemia, 8

Polypodiaceae, 1 Marsilea, 1 Equisetum, 2 Selaginellas, 3 Juniperaceae, and 1 Ephedra.—The manuscript was ready for publication at the author's death and is issued by B. C. Tharp, one of her students.—*L. Pace.*

APPLIED ECOLOGY

3594. Alfonsus, Alois. **De Hemelboom (Ailanthus glandulosa). [The Tree of Heaven.]** Practische Imker **5**: 85. 1921.—A report is given on the excellent honey-producing qualities of this tree with a recommendation for its general planting for shade and honey.—*M. G. Dadant.*

3595. Alfonsus, Alois. **Der Götterbaum (Ailanthus glandulosa). [The Tree of Heaven.]** Leipziger Bienenzeitg. **36**: 122. 1921.—An appeal is made for the general planting of this tree, showing its desirability as an addition to the honey flora of northern Europe.—*M. G. Dadant.*

3596. Baldwin, F. M. **Velvet beans.** Dixie Beekeeper 5^7: 20. 1921.—The nectar gathered from velvet bean is so thin that it will run in streams from the combs if they are turned horizontally. The cappings of the comb honey are very white, but the extracted honey is light red in color.—*J. H. Lovell.*

3597. Cale, G. H. **Beekeeping in Maryland.** Amer. Bee Jour. **61**: 305–308. *Fig. 1–4.* 1921.—The general conditions and the nectar resources of Maryland are outlined. According to its physical features the state is divided into 3 regions: the Coastal Plain, the Piedmont Plateau, and the Mountainous Region. The most important honey plants are white clover, alsike clover, and tulip-tree. The clovers are common in the Midland Region (Piedmont Plateau) where dairying is an important industry, but as the soil is deficient in lime they secrete nectar less freely than in the glacial soils of Minnesota and Wisconsin. The mean daily temperature also during June and July is usually not long favorable to nectar secretion. A good crop is obtained about once in 3 years. Tulip-tree (*Liriodendron tulipifera*) on the hillsides of the lower Midland Region is one of the predominating species, often forming 80 per cent of the forest. It is less abundant in the upper Midland Region, and in the Mountainous Region it is either rare or absent. It is a very reliable honey plant, yielding a large quantity of nectar; the honey is dark amber.—The largest apiaries are located near the cities of Washington, Baltimore, Frederick, Hagerstown, and Cumberland. The average yield of honey per colony is only about 30 pounds, due to the fact that the honey flow comes very early, before the colonies are sufficiently strong to take advantage of it.—At the close of the paper a list of the honey plants of Maryland is given with brief comments on their distribution and value.—*J. H. Lovell.*

3598. Claustre, R. **Apiarian flora.** Amer. Bee Jour. **61**: 402. 1921.—Malope (*Malope malacoides*) is an excellent honey plant in France, but it would be inadvisable to introduce it into the U. S. A.—*J. H. Lovell.*

3599. Coleman, Geo. A. **Beekeeping in our California national forests No. II. Honey flora.** Western Honey Bee **9**: 215–217. 1921.—Growing on dry sandy or gravelly soils in the arid region of the Colorado Basin to San Diego County, screw-pod mesquite (*Strombocarpa odorata*) yields a light amber honey of good quality. A similar honey is obtained from Texas mesquite on the plains, mesas, and canyons of southern California where it blooms from May to July. California red-bud (*Cercis occidentalis*) extends from the region around Mt. Shasta to San Diego County. The honey is light in color with a pleasant flavor and is valuable for early brood-rearing. In southeastern California catsclaw (*Acacia Greggii*) yields an excellent white honey. Retama or horse-bean (*Parkinsonia aculeata*) is also a valued honey plant in southern California.—*J. H. Lovell.*

3600. Coleman, Geo. A. **Beekeeping in our California national forests No. II. Honey flora.** Western Honey Bee **9**: 247–249. 1921.—Palo verde (*Cercidium Torreyanum*) in the deserts of southern California, Arizona, and Sonora yields a light colored honey of good quality. Pea chaparral, one of the most characteristic of the chaparral shrubs, forms dense thickets in the Coast Ranges. Other well-known and valuable honey plants are alfalfa, white sweet clover, the annual yellow sweet clover, and burr-clover (*Medicago hispida*). Indigo bush (*Dalea spinosa*) and Mexican ironweed (*Olnea tesota*) are also listed.—*J. H. Lovell.*

3601. Coleman, Geo. A. **Beekeeping in our California national forests No. II. Honey flora.** Western Honey Bee 9: 280–282. 1921.—There are many species of clover (*Trifolium*) in California, but their value as honey plants is very imperfectly understood. Deer-weed or wild alfalfa (*Lotus glaber*), common in the Coast Ranges, yields a water-white honey, which granulates in a few months. Five species of sumac (*Rhus*) and 4 of maple (*Acer*) are reported to furnish considerable surplus.—*J. H. Lovell.*

3602. Coleman, Geo. A. **Beekeeping in our California national forests No. II. Honey flora.** Western Honey Bee 9: 312–313. 1921.—The range of the California buckeye (*Aesculus californica*) is given in detail in order that beekeepers may avoid locating near it if they so desire. There has been much complaint that many bees perish while gathering the nectar of buckeye. Other reports affirm that a surplus of 25 pounds per colony has been obtained without loss of bees. Madrona (*Arbutus Menziesii*), one of the handsomest shrubs in California, is the source of a golden amber-colored honey with a very heavy body and a delicious peculiar flavor, which easily distinguishes it from all other honeys.—*J. H. Lovell.*

3603. Coleman, Geo. A. **Beekeeping in our California national forests No. II. Honey flora.** Western Honey Bee 9: 344–346. 1921.—In this installment of his review of the honey plants of California, the author considers the manzanitas, buckthorns, and species of *Ceanothus*. Four species of manzanita are listed. The common manzanita (*Arctostaphylos Manzanita*) secretes nectar so freely that it can be shaken from the flowers like dew. Three species of buckthorn (*Rhamnus*) are valuable,—cascara sagrada (*R. purshiana*), coffeeberry (*R. californica*), and red berry (*R. crocea*). *Ceanothus*, or mountain lilac, is represented in California by numerous species, 6 of which are listed as honey plants; they yield a white or light-colored honey with a delicious flavor.—*J. H. Lovell.*

3604. Coleman, Geo. A. **Beekeeping in our California national forests No. II. Honey flora.** Western Honey Bee 9: 376–377. 1921.—Willow-herb (*Epilobium angustifolium*), a most valuable honey plant in Washington and Oregon, is also abundant on burned-over areas in the Sierra Nevada. Fiddle-neck (*Phacelia tanacetifolia*) and caterpillar phacelia (*P. hispida*) yield a white honey with pleasant aromatic flavor. One of the most important honey plants of California is vinegar weed or blue curls (*Trichostema lanceolatum*), which grows on dry plains and low hills throughout the Coast Ranges and the Sierra Nevada foothills. It blooms from August to November and is the source of a water-white honey of fine flavor, which granulates very quickly—in some cases before the cells are sealed. Horehound (*Marrubium vulgare*) yields a dark medicinal honey, which is a pest on a sage range as it darkens and spoils the sage honey.—*J. H. Lovell.*

3605. Cowles, H. C. **Crop centers.** [Rev. of: Waller, A. E. **Crop centers of the United States.** Jour. Amer. Soc. Agron. 10: 49–83. *8 fig.* 1918 (see Bot. Absts. 1, Entry 11).] Bot. Gaz. 69: 356. 1920.

3606. Dadant, C. P. **More bee pasture.** Amer. Bee Jour. 61: 431. 1921.—The rapid increase in the area planted with sweet clover is in many localities greatly increasing the amount of honey produced.—*J. H. Lovell.*

3607. Dadant, C. P. **Sweet clover and lime in Illinois.** Amer. Bee Jour. 61: 394. 1921. —Sand land along the Mississippi, Illinois, and Wabash rivers can be greatly improved by the use of lime and sweet clover.—*J. H. Lovell.*

3608. DeBoer, J. **Beekeeping in foreign lands.** Gleanings from Bee Culture **49:** 626–627. 1921.—The author gives a list of the more important honey plants found in Mexico.—*J. H. Lovell.*

3609. Gaar, Karl. **Verbesserung der Bienenweide. [Improving the bee forage.]** Bienen-Vater **53:** 129. 1921.—The importation of milkweed (*Asclepias dacia*) from America and Siberia and its general culture as a valuable addition to the honey flora are advised.—*M. G. Dadant.*

3610. Gaar, Karl. **Verbesserung der Bienenweide. [Improving the honey flora.]** Bienen-Vater **53:** 129. 1921.—A plea is made for the more general cultivation of milkweed (*Asclepias*) in gardens and along railroad and other embankments. It is invaluable on account of its long blooming season.—*M. G. Dadant.*

3611. Hasslbauer, A. M. **Snow-on-the-mountain (Euphorbia marginata).** Beekeeper's Item **5:** 268. 1921.—Reports of a surplus from this plant have been received from eastern central, and southern Texas. The cup-like involucres have 5 white, petal-like appendages behind as many saucer-shaped nectaries.—*J. H. Lovell.*

3612. Hasslbauer, A. M. **Sumac as a honey plant.** Beekeeper's Item **5:** 236–237. *Fig. 1.* 1921.—Six species of sumac occur in Texas which are valuable as honey plants. Shawnee hair (*Rhus rhomboidea*) is common in the central and chaparral sections. It blooms from January to March and bees visit it in great numbers. Small-leaved sumac (*R. microphylla*), the most common species, grows in the hilly parts of the state. It blooms in March and again in the fall. Evergreen sumac or "kinnikinick" (*R. virens*), common on the Edwards Plateau and in the Trans-Pecos country, also blooms in March and again in the fall. The honey is dark amber and ill-flavored. Poison ivy (*R. radicans*) blooms from April to October. Common sumac (*R. copallina*) is distributed over a large part of the state, blooms in July and August, and yields a light amber honey of fair flavor. Smooth sumac (*R. glabra*) grows in eastern Texas, blooms in July, and yields a light amber honey of good flavor.—*J. H. Lovell.*

3613. Heidema, T. **Verband tusschen groeiplaatsen van Kievietsbloemen en grondsoort. [Relation between location of Fritillaria Meleagris and soil type.]** Levende Natuur **26:** 77–78. 1921.—*Fritillaria* prefers especially heavy clay soils; it never occurs in bogs. Observations were made near Haren, Paterswolde, and the western banks of Zwarte Water (Netherlands). The occurrence of this species may be of practical value in estimating soil types.—*J. C. Th. Uphof.*

3614. Herrick, R. S. **Bees and horticulture.** Rept. State [Iowa] Apiarist **1919:** 23–24. 1920.—Attention is called to bees as pollinating agents in orchards.—*L. H. Pammel.*

3615. Hohenhein, Rentschler. **Die Bienen als Blütenbefruchter. [Bees as pollinators of flowers.]** Die Bienenflege **43:** 183. 1921.—Honeybees are far more valuable as pollinators of flowers than as producers of honey and wax.—*M. G. Dadant.*

3616. Klumpar, Josef. **Interessante Beobachtungen über das Befliegen der Herbstzeitlose. [Interesting observations on the bloom of the meadow saffron.]** Bienen-Vater **53:** 155. 1921.—Observations are reported on the visits of honeybees to the meadow saffron (*Colchicum autumnale*). Bees which visited the blossoms became intoxicated and in most instances were unable to return to the hives.—*M. G. Dadant.*

3617. Lovell, J. H. **Altitude and the secretion of nectar.** Amer. Bee Jour. **61:** 479–483. *Fig. 1–7.* 1921.—A discussion is presented of the effects of intense light and low temperature on the secretion of nectar at high altitudes and latitudes.—*J. H. Lovell.*

3618. Melander, A. L. **First annual report of the Division of Apiculture to the Government of Washington State College of Washington.** *119 p.* 1921.—The author gives a preliminary list of the principal honey and pollen plants of Washington with brief descriptions of the more important species.—*J. H. Lovell.*

3619. Miller, Hugh. **Veronica or speedwell.** Gleanings in Bee Culture 49: 566. 1921. —Near Kansas City, Missouri, during July, 1921, there were 4–5 acres of old pasture land purple with the bloom of *Veronica* or speedwell. Honeybees gathered nectar for an entire month from the flowers, which were in terminal spikes.—*J. H. Lovell.*

3620. Oliver, F. W. **Spartina problems.** Ann. Appl. Biol. 7: 25–39. 1920.—The present article deals primarily with *Spartina Townsendii*, which is rapidly monopolizing the extensive tidal mud flats of the south coast of England. In addition to being a botanical problem of the first order, the amazing spread of *Spartina* is raising economic problems which must be met. This species made its appearance in Southampton waters in 1870. It is unknown in any other portion of the world, and is believed to have originated as a hybrid from *S. stricta* and *S. alterniflora*. Sea grass (*Zostera*), which was formerly the dominant type of vegetation in the soft mud flats, has been reported practically annihilated with the advent of *Spartina*. The appearance of such a vigorous plant with its great capacity for the accretion of mud and its promise of indefinite spread raises the vital question of its effect on navigation in the waters concerned. Attention is called to the necessity for studying this question. As an agent for reclamation it seems to have considerable promise. As a food for stock and as raw material for paper, investigations are not sufficient for definite conclusions but they seem to warrant further studies.—*H. D. Barker.*

3621. Paddock, F. B. **Bees and horticulture.** Rept. Iowa State Hort. Soc. 55: 124–129. 1920.—This is a discussion of the importance of bees and pollination in the orchard. The author gives the usual classification of pollinating agents,—wind, water, birds, etc.—*L. H. Pammel.*

3622. Pammel, L. H. **A few honey plants of the rose family.** Rept. State [Iowa] Apiarist **1919**: 56–69. 1920.—The blooming period of *Prunus americana*, *Pyrus Malus*, and *P. ioensis* for different sections of the state of Iowa is reported. A description of methods of pollination for these species and *Prunus pennsylvanica* is given. The pollination is given only in so far as it applies to the honeybee—*L. H. Pammel.*

3623. Pammel, L. H. **Some honey plants of Alabama.** Amer. Bee Jour. 61: 360–361. 1921.—In the vicinity of Montgomery the chief honey plant is the biennial white sweet clover (*Melilotus alba*). The biennial yellow sweet clover (*M. officinalis*) and the small annual yellow sweet clover (*M. indica*) are also under cultivation, but the flowers of *M. indica* are only occasionally visited by bees. White clover is fairly common, and is visited frequently by honeybees. Several species of sumac are common on gravelly soils. Horsemint is abundant on clay soils and yields nectar well. Important nectar yielding trees in Alabama are the magnolias, white tupelo (*Nyssa aquatica*), and 2 species of basswood. The Cherokee rose (*Rosa laevigata*) and the McCartney rose (*R. bracteata*), climbing everywhere, furnish an abundance of pollen.—*J. H. Lovell.*

3624. Parks, H. B. **Honey plant areas of Texas.** Amer. Bee Jour. 61: 347–348. *Fig. 1.* 1921.—Notes are given on the principal regions for beekeeping in Texas and its nectar yielding flora. The state is so large that its flora comprises a great variety of plants. Northeastern Texas is largely covered by the western extension of the great pine and hardwood forest of the Gulf Coastal Plain. The chief components of this forest are long-leaf pine, short-leaf pine, loblolly pine, post oaks, and a variety of hardwood trees in the river bottomlands and swamps. Common honey plants are maple, basswood, white tupelo (*Nyssa aquatica*), persimmon, yaupon (*Ilex vomitoria*), rattan-vine (*Berchemia scandens*), red-bud, and a variety of herbaceous plants.—The Rio Grande Plain, or Chaparral Region, is the commercial section for beekeeping. The flora is of Mexican origin, and according to Bray includes 70–80 species of small trees and shrubs absent in the Atlantic forests of east Texas. This region less than 100 years ago was largely grassland. Except in the river valleys there are no large trees, but vast areas are covered with a chaparral of low thorny bushes and small trees 2–15 feet tall. Thirty per cent of the species belong to the Leguminosae. Important honey plants are granjenó (*Momisia pallida*), agarita (*Berberis trifoliata*), Texas ebony (*Siderocarpus flexicaulis*), mesquite, Leucaena, retama (*Parkinsonia aculeata*), red bud, *Eysenhartia*, colima (*Zanthoxylum pterota*), coma (*Bumelia lycioides*), huajilla (*Acacia Berlandieri*), catsclaw (*Acacia Greggii*), and white brush (*Aloysia ligustrina*).—West of the Coastal Plain lies the Black Prairie or Cotton Belt, the underlying rocks of which are Upper Cretaceous limestones. Throughout this area cotton is an excellent honey plant, and yields a mild-flavored white honey. Horsemint (*Monarda punctata*), marigold (*Gaillardia pulchella*), boneset, and smartweed are other valuable sources of honey.—Central Texas, west of the Black Prairie, is largely covered with mesquite (*Prosopis grandulosa*), which in favorable seasons yields a heavy flow of nectar. It is not probable that this section will ever produce honey in large quantities, as the rainfall is much less than on the Rio Grande Plain. Locally, catsclaw, white brush, and on the Edwards Plateau several species of sumac, yield a surplus of honey.—The Panhandle or Staked Plains, also called the West Plains, is a level country with few streams. The flora resembles that of western Kansas. There are no large trees, but shrubby mesquite and hackberry are found in the canyons and along the streams. There are very few bees in this section.—The eastern portion of the Trans-Pecos Region consists of broad level plains covered with sotol or beargrass, yucca, cactus, and agave; the western portion is broken by numerous short mountain ranges, surmounted with pine and mountain cedar, with intervening treeless valleys. Near El Paso and at Barstow there are large areas of irrigated alfalfa. Desert honey plants are mesquite, tornillo, and catsclaw.—*J. H. Lovell.*

3625. Parks, H. B. **The cotton plant as a source of nectar.** Amer. Bee Jour. **61**: 391–393. *Fig. 1–4.* 1921.—In southeastern U. S. A. cotton is usually a poor honey plant, but in Texas, parts of Oklahoma, Arkansas, and the Imperial Valley, California, it is the source of a large amount of honey. In Texas it is only in the Black Lands that cotton yields nectar copiously. A fertile soil containing a high percentage of lime and organic matter and a permanent supply of water are required. The floral involucral and leaf nectaries are described, and the water content of the nectar estimated.—While cotton blooms continuously from the middle of June until frost, there are 2 distinct blooming periods during which there are large nectar flows. During the 1st, when the plant is about 2 feet tall, the greater part of the cotton honey is stored. The 2nd period is in September or October, when cotton reaches "the flower garden stage," and the flow is occasionally very heavy.—According to the author's observations the cotton plant is highly self-fertile; and, as the pollen is only rarely collected by honeybees, he concludes that the latter are not important pollinating agents.—*J. H. Lovell.*

3626. Pellett, F. C. **Beekeeping in New York.** Amer. Bee Jour. **61**: 396–398. 1921.—There are few localities in the U. S. A. capable of supporting as many bees as the buckwheat region of New York. A few years ago there were 700 colonies at Delanson in one yard. Buckwheat yields nectar most freely when the nights are cool and the days clear and warm. But the larger part of the commercial honey crop in this state is secured from white and alsike clovers. Basswood is still important in a few places. The large orchards offer immense areas of bloom, but the colonies are seldom strong enough so early in the season to store much surplus from this source. At Prattville wild thyme (*Thymus serpyllum*) is a valuable honey plant, and 125 pounds of surplus honey per colony has been obtained from this plant. Purple loosestrife is common along the Hudson River and westward in part of the Mohawk Valley. It yields a dark-colored inferior honey. In the fall goldenrod and aster furnish winter stores. —*J. H. Lovell.*

3627. Pellett, F. C. **The false indigo.** Amer. Bee Jour. **61**: 445. 1921.—Five species of *Amorpha* are widely distributed in the U. S. A. but are not known to be important as honey plants except in Nebraska and Kansas. False indigo or river locust (*A. fruticosa*) yields an abundance of nectar and pollen.—*J. H. Lovell.*

3628. Phillips, E. P. **Veld burning experiments at Groenkloof—second report.** Union of South Africa Dept. Agric. Sci. Bull. 17. *7 p., 7 fig., 2 diagr.* 1921.—The objects of these experiments are to find out the effect of veld fires on the vegetation at different seasons of the year, to see to what extent the practice of burning is injurious or beneficial, and, if beneficial, the best season of the year at which to burn. Farmers assert that the health of their stock is affected by the veld burned at certain seasons of the year. Nothing is known as to the cause of this, and the experiments now being carried out may throw some light on the subject. At the same time investigations are being conducted as to the effect of overgrazing by sheep and cattle on the vegetation.—In December, 1919, 9 oxen were placed in a camp 2 morgen in extent and 30 sheep in a camp of the same size. The oxen soon completely grazed down the grass; the sheep camp was not grazed down to nearly the same extent. The observations during the year point to the fact that the later the veld is burned the greater the number of shrubs in the resulting vegetation. The plots burned during May to the beginning of July were typical grass veld at the end of January the following year. Plots burned from the beginning of September to the end of November resulted in the grasses being very backward at the end of January, or shrubs, especially *Vigna angustifolia*, may dominate. Another interesting point noted was the dominant nature of *Elephantorrhiza Burchellii* in the early burns; this gradually decreased in the later burns and *Vigna angustifolia* became dominant instead.—*E. P. Phillips.*

3629. Prothero, John. **Deceptive honey flora.** Amer. Bee Jour. **61**: 409. 1921.

3630. Root, A. I. **The Hubam clover.** Gleanings from Bee Culture **49**: 444–446. *Fig. 1.* 1921.—A report is given on the new annual variety of the biennial white sweet clover.—*J. H. Lovell.*

3631. Root, E. R. **The Hubam sweet clover.** Gleanings from Bee Culture **49**: 551–554. *Fig. 1–8.* 1921.—The new annual white sweet clover is cultivated extensively in the Black Belt of Alabama. It is not only a valuable fodder plant but also yields abundant nectar. The quality of the honey is similar to that of the biennial species.—*J. H. Lovell.*

3632. Shafer, Geo. B. **The honeybee and color vision.** Amer. Bee Jour. **61**: 443–445. 1921.—A résumé is presented of the experiments of Frisch and Hess on the color vision of honeybees.—*J. H. Lovell.*

3633. Sklenar, Guido. **Asclepias carnosa.** Bienen-Vater **53**: 129. 1921.—A description is given of the pollen of milkweed, which often entraps honeybees when on the flowers in search of nectar.—*M. G. Dadant.*

3634. Tschudin, E. **Pollen in bees' diet.** Gleanings from Bee Culture **49**: 759–760. 1921.

3635. Wiegand, K. M. **Protection of nectar.** Gleanings from Bee Culture **49**: 487–489. *Fig. 1–2.* 1921.—The author describes various ways and special contrivances by which nectar is protected from rain and undesirable guests.—*J. H. Lovell.*

3636. Wilbrand. **Der Götterbaum als Honigquelle. [The Tree of Heaven as a honey source.]** Leipziger Bienenzeitg. **36**: 145–146. 1921.—A description is given of *Ailanthus glandulosa* as a producer of honey, with some limitations affecting its yield of nectar.—*M. G. Dadant.*

3637. Wilder, J. J. **Black gum as a honey plant.** Dixie Beekeeper **5^5**: 8–9. 1921.

3638. Wilder, J. J. **Cotton as a honey plant.** Dixie Beekeeper 5^4: 13–14. 1921.

3639. Wilder, J. J. **Goldenrod as a honey plant.** Dixie Beekeeper 5^6: 18–19. 1921.

3640. Wilder, J. J. **Huckleberry.** Dixie Beekeeper 5^5: 9–10. 1921.—The huckleberries are abundant in Georgia and yield a beautiful pink colored, thin honey which has a pronounced flavor. It is seldom obtained pure and commercially is not important.—*J. H. Lovell.*

3641. Wilder, J. J. **Partridge pea as a honey plant.** Dixie Beekeeper 5^4: 5–7. 1921.—The flowers of the partridge pea are nectarless and are pollinated by bumblebees. The nectar is secreted by glands on the upper side near the base of the leaf-stems. It contains a high percentage of water, and the honey requires a long time to ripen. An average of about 60 pounds per colony is obtained from this plant. The honey is light amber-colored with medium body, and a mild agreeable flavor.—Partridge pea grows well on a high, thin, sandy soil from which grain has been harvested. It yields nectar most heavily in the sand-ridge section of the central part of Florida, a belt of high sandy soil extending from the north border line to Dade City.—*J. H. Lovell.*

3642. Wilder, J. J. **Snowvine as a honey plant.** Dixie Beekeeper 5^5: 11–12. 1921.—Snowvine or pepper-vine (*Cissus arborea*) grows in damp rich soil along rivers and small streams throughout the southern [U. S. A.] states. It blooms in July and August and yields a dark amber honey with a fine flavor. It is not unusual to obtain an average surplus of 50 pounds per colony.—*J. H. Lovell.*

3643. Wilder, J. J. **Spring titi as a honey plant.** Dixie Beekeeper 5^3: 4. 1921.—Spring titi (*Cliftonia monophylla*) in very wet land throughout a large part of the Coastal Plain grows in dense thickets called "titi swamps." It is a valuable commercial honey plant, yielding a large surplus of light amber honey with a strong flavor. The honey granulates quickly when extracted. But for this plant, many thousand colonies of bees would perish or be greatly depleted.—*J. H. Lovell.*

3644. Wilder, J. J. **Summer titi as a honey plant.** Dixie Beekeeper 5^5: 6–7. *Fig. 1–2.* 1921.—The blooming of summer titi (*Cyrilla racemiflora*) closes the spring honey flow in Georgia. It yields nectar sparingly, and it is seldom that even a strong colony stores more than 50 pounds of honey. The honey is light amber and has a mild rich flavor.—*J. H. Lovell.*

3645. Wilder, J. J. **The aster as a honey plant.** Dixie Beekeeper 5^6: 9–11. 1921.

3646. Wilder, J. J. **The great peach section.** Dixie Beekeeper 5^7: 6–7. 1921.—The great peach orchards of Georgia bloom so early, while frost and cold winds are still common, that they do not yield a surplus of honey.—*J. H. Lovell.*

3647. Wust. **Irtümer unserer Bienennährpflanzen.** [Errors in our honey-producing plants.] Deutsch. Illus. Bienenzeitg. 38: 86–88. 1921.—The author discusses the value, as honey-producers, of plants with inconspicuous and green blossoms. These are generally regarded as unattractive to bees, but many are good honey plants.—*M. G. Dadant.*

3648. Yancey, J. D. **Midsummer nectar.** Gleanings from Bee Culture 49: 695. 1921.—At Bay City, Texas, horsemint (*Monarda punctata*), purple thistle (*Eryngium Leavenworthii*), and cotton yield a large amount of nectar during the extremely hot, dry summer weather.—*J. H. Lovell.*

3649. Zaiss. **Die einjährige Riesenhonig (Hubam)—Klee.** [The great annual honey plant, Hubam clover.] Neues Schlesisches Imkerblatt 20: 183. 1921.—A report is given on the great results obtained in America with the newly discovered Hubam clover with special reference to its honey-producing qualities and its production of humus during a short period of growth.—*M. G. Dadant.*

MISCELLANEOUS

3650. Anonymous. Alpine plants on Snowdon. Kew Bull. **1921**: 319–320. 1921.—Notes are given on the establishment of a garden for the cultivation of alpine plants.—*E. Mead Wilcox.*

3651. Anonymous. Biological exploration of the Amazon basin. Brooklyn Bot. Gard. Rec. **10**: 97. 1921.—The Mulford Expedition, comprising H. H. Rusby, director, Orland E. White, botanist, Frederick L. Hoffman, anthropologist, William M. Mann, entomologist, Everett Pearson, ichthyologist, George S. McCarty, stenographer and taxidermist, and Gordon McCreagh and Mr. Owen Cattell, photographers, sailed June 1, 1921, for the biological exploration of the Amazon basin. The route is eastward from LaPaz, crossing the Andes at an elevation of over 19,000 feet.—*C. S. Gager.*

3652. Ahrens. Mittheilungen über den Naturschutz in den Vereinigten Staaten. [Conservation in the United States.] Beiträge Nat. Denkmalpflege **9**: 96–109. 1919.—The paper gives a brief account of the history of national parks beginning with the Yellowstone in 1872. In 1915 there were 14 national parks. Attention is called to the establishment of a national park service in 1916. A general account of the rules and regulations of the national park service is given. There follows a discussion of the purpose of the Ecological Society of America, which will endeavor to make a biological study of the national and state parks. The paper contains a brief description of the national parks and monuments. There is also a description of state parks, mention being made of the work in Iowa, South Dakota, Maryland, Illinois, New York, Colorado, and in Canada.—*L. H. Pammel.*

3653. Butler, Albert E. Notes by a collector in the Colorado Rockies. Nat. Hist. **19**: 170–181. *Pl. 12.* 1919.—This paper consists of 12, for the most part full page, half-tones from the author's photographs of trees and flowers; running notes accompany the plates.—*Albert R. Sweetser.*

3654. Carr, C. E. M. The Backbone. Rept. Iowa State Bd. Conservation **1919**: 48–50. 1920.—This paper describes the stone cliffs and plants.—*L. H. Pammel.*

3655. Compton, R. H. The Karroo Garden at Whitehills. Jour. Bot. Soc. South Africa **7**: 11–12. 1921.

3656. Edwards, Gwendolen. The Rhodean reserve for native South African plants. Jour. Bot. Soc. South Africa **7**: 17–18. 1921.

3657. Fox, Henry. Two Orthoptera new to New Jersey, with comments on their local habits. Entomol. News **32**: 264–270. 1921.—Notes are given on 2 species of grasshoppers and their plant associations.—*O. A. Stevens.*

3658. Hayden, Ada. Conservation of prairie. Rept. Iowa State Bd. Conservation **1919**: 283–284. 1920.—Agriculture has banished the prairie and caused the disappearance of wild flowers. A bit of prairie land should be preserved before it is too late.—*L. H. Pammel.*

3659. Lees, James H. Some ecological aspects of conservation. Rept. Iowa State Bd. Conservation **1919**: 270–276. 1920.

3660. Lees, James H. The Palisades should be a state park. Rept. Iowa State Bd. Conservation **1919**: 94–95. 1920.—This is a running account of the geology and the plants; cedars are found on the homogeneous escarpment of limestone rock.—*L. H. Pammel.*

3661. Mills, Enos A. The wars of the wind at timber-line. Nat. Hist. **19**: 427–435. *10 illus.* 1919.—A popular description is given of the struggle of the tree for existence in the Rocky Mountains against wind and snow, moving stones, and fire.—*Albert R. Sweetser.*

3662. Mogg, A. O. D. **A method of veld determination.** South African Jour. Sci. **17:** 222–226. 1921.

3663. Pammel, L. H. **Report of the Backbone area.** Rept. Iowa State Bd. Conservation **1919:** 41–42. 1920.—This is a short account of the geology and plants of the Backbone Park in Delaware County.—*L. H. Pammel.*

3664. Portal, M. **Abraham's oak.** Kew Bull. **1920:** 257–258. *1 pl.* 1920.—This article gives ecological notes on *Quercus calliprinos* in Palestine.—*E. Mead Wilcox.*

3665. Schonland, S. **A trip to the Knysua.** Kew Bull. **1920:** 225–231. 1920.

3666. Seward, A. C. **The Danish Arctic station.** Nature **108:** 320–321. *2 fig.* 1921.—The station at Godhavn, on the south coast of Disco Island off the west coast of Greenland (69°14″ N.), is described. This is the "only station in the world north of the Arctic Circle where it is possible under very favorable conditions and with adequate facilities to carry out experimental scientific investigations." The Godhavn district has an exceptionally rich and varied flora.—*O. A. Stevens.*

3667. Shimek, B. **Conservation of natural scenery in Iowa.** Rept. Iowa State Bd. Conservation **1919:** 276–279. 1920.—The author discusses erosion along streams and the conservation of timber, lakes, and streams for the maintenance of moisture. He urges the conservation of plants and animals for the study of natural conditions for scientific purposes.—*L. H. Pammel.*

3668. Small, John K. **A botanical excursion to the Big Cypress.** Nat. Hist.. **20:** 488–500. *Pl. 8.* 1920.—A preliminary survey is reported of the Big Cypress Swamp, between the Everglades and the Gulf of Mexico. The writer accompanied W. Stanley Hanson, of the U. S. Biological Survey, through this region, making notes, collections, and photographs. Little is known concerning the natural history of the region. Difficulties of the trip and the nature of the country traversed are described.—*Albert R. Sweetser.*

3669. Soper, E. K., and C. C. Osbon. **Peat in Michigan.** Jour. Amer. Peat Soc. **14**^{4}**:** 8–16. 1921.—The peat deposits of Michigan consist largely of "muskegs" and grass-sedge marshes in basins of glacial origin and are similar in most respects to those of Minnesota and Wisconsin. It is estimated that 80 per cent of the peat of Michigan is in the northern peninsula.—*G. B. Rigg.*

3670. Spurrell, J. A. **The disappearance of native plants in Iowa.** Rept. Iowa State Bd. Conservation **1919:** 235–237. 1920.—Such plants as *Anemone patens* (var. *Wolfgangiana*), *Gentiana Andrewsii*, *G. puberula*, *Cypripedium candidum*, *Lilium philadelphicum*, *L. superbum*, *Nymphaea tuberosa*, *Calla palustris*, need protection in Iowa.—*L. H. Pammel.*

3671. Weiss, H. B., and E. West. **Additional notes on fungous insects.** Proc. Biol. Soc. Washington [D. C.] **34:** 167–172. *Pl. 1.* 1921.—Additions are made to lists previously published.—*J. C. Gilman.*

3672. White, J. W. **Notes on Bristol plants.** Jour. Botany **59:** 299. 1921.—Ecological notes on *Salicornia dolichostachya*, *Glyceria maritima*, *Spartina Townsendi*, *Limosella aquatica*, and *Cyperus fuscus* are given.—*S. H. Burnham.*

3673. Wolfe, J. J. **The plankton of the Chesapeake Bay.** Jour. Elisha Mitchell Sci. Soc. **36:** 3–4. 1920.—The results are summarized under 7 headings, of which the last is: "Neither 'count' nor 'volume' gives an absolutely true indication of food available. These two in connection with 'incineration' would probably give a more correct idea."—*W. C. Coker.*

FOREST BOTANY AND FORESTRY

J. S. Illick, *Editor*

(See also in this issue Entries 3425, 3460, 3501, 3504, 3511, 3514, 3597, 3946, 4035, 4074, 4088, 4191, 4202, 4306, 4325, 4361, 4473, 4502, 4584, 4745, 4784, 4790, 4853, 4854, 4878)

3674. Anonymous. Allgemeine Wirtschaftsgrundsätze der Württembergischen Staatsforstverwaltung. [General principles for management of Wurttemberg state forests.] Deutsch. Forstzeitg. 36: 916–917. 1921.—Production must be on a sustained yield basis; the maintenance and improvement of forest soil must be given first consideration; the growing of mixed stands is to be encouraged; natural reproduction is to be the rule, using artificial reforestation only where natural reproduction does not succeed, and then using only home grown seeds and plants, or those of favorable origin. The fullest possible advantage must be taken of thinnings, and the practice of making large and continuous cuttings must give way to that of scattering the cut widely in small units.—*W. N. Sparhawk.*

3675. Anonymous. Conseil superieur des forêts. [The superior forest council.] Bull. Soc. Centrale Forest. Belgique 24: 225–239. 1921.—The discussion of the recent law in its application to forest properties is given. The differences between the sale of forest products as revenue and as the liquidation of capital are pointed out. The distinction rests upon whether the forest is managed for continuous revenue or is disposed of as real estate. It is an interesting commentary on forest and other classes of property.—*W. C. Lowdermilk.*

3676. Anonymous. Die Agrarreform und die grossen Waldbesitze in Jugoslawien. [Agrarian reform and large forest estates in Jugoslavia.] Wien. Allg. Forst u. Jagd Zeitg. 40: 33–34. 1922. [Translation from Jugoslovenska Suma.]—Official orders and laws passed since February, 1919, are cited with explanatory comment. The object of these laws is to maintain forest estates except where the land is suitable and needed for agricultural colonization. Cutting is not allowed to exceed the prescribed annual felling budget (annual growth). Title is left in the hands of the owner but strict state supervision is exercised and in cases of non-compliance the estates may be expropriated.—*F. S. Baker.*

3677. Anonymous. Effect of pruning green branches from larch. Trans. Roy. Scottish Arbor. Soc. 35: 79. 1921.—A widely spaced larch plantation was pruned when 25–35 years old. The branches were large. After pruning many of the trees bled, and for 6 or 7 years following growth was not so rapid as it had been. When felled 60 to 70 years later, many of the trees proved to be badly decayed. Unpruned trees were quite sound in every case.—*C. R. Tillotson.*

3678. Anonymous. Excursion forestière. [A forest excursion.] Bull. Soc. Centrale Forest. Belgique 24: 271–274. 1921.

3679. Anonymous. Forest fire laws and regulations—1921. *87 p.* California State Bd. Forest.: Sacramento, 1922.—A synopsis and codification of all California laws which deal with forestry are presented. Fire fighting rules are briefed.—*Woodbridge Metcalf.*

3680. Anonymous. Gifford Pinchot on the Snell bill. Amer. Forest. 28: 244–245. 1922. —Testimony before the Agricultural Committee of [U. S. A.] Congress is presented.—*Chas. H. Otis.*

3681. Anonymous. L'impôt forestier au Senat. [Consideration of the forest tax law in the Senate.] Bull. Soc. Centrale Forest. Belgique 24: 283–288. 1921.—A discussion is given of the injustices arising out of the new forest taxation.—*W. C. Lowdermilk.*

3682. Anonymous. **Loi autorisant provisoirement le gouvernement à s'opposer à l'exploitation excessive de certains bois et de certaines forêts.** [A law provisionally authorizing the government to prevent the excessive cutting in certain woods and forests.] Bull. Soc. Centrale Forest. Belgique **24**: 239–256. 1921.—Gives full discussion of law by the Chamber of Representatives. It was designed to check the free play of the economic demand to the detriment of general benefits of the forests to the nation. The 2 sides of the conflict are clearly brought out in the discussion.—*W. C. Lowdermilk.*

3683. Anonymous. **Loi autorisant provisoirement le gouvernement à s'opposer à l'exploitation excessive de certains bois et de certaines forêts. Suite.** [A law provisionally authorizing the government to prevent the excessive cutting in certain woods and forests.] Bull.Soc. Centrale. Forest. Belgique **24**: 298–311. 1921.—The record of the discussion of this law by the Chamber of Representatives is given. It was designed to check the free play of economic demands to the detriment of public benefits. The 2 sides of the issue are presented.—*W. C. Lowdermilk.*

3684. Anonymous. **Research and education in the Geddes report.** Nature **109**: 197–199. 1922.—A vigorous protest is made against the attitude of the Committee on National Expenditure toward education and research in making a supercut of £18,000,000. "The activities of the Forestry Commission are threatened with extinction by the report which recommends that the scheme of afforestation by the State shall be discontinued."—*O. A. Stevens.*

3685. Anonymous. **The forest resources in India.** [Abstract from: **The work of the Forest Department in India.** *54 p., 17 pl.* Harrison and Sons: London, 1920.] Nature **106**: 729–732. *3 fig.* 1921.

3686. Anonymous. **The southern beech (Nothofagus) forests of New Zealand.** New Zealand Jour. Agric. **23**: 353–360. *3 fig.* 1921.—Confined largely to areas which could not be converted into grasslands, these forests regenerate rapidly and yield a good supply of commercial timber.—*N. J. Giddings.*

3687. Anonymous. **Übersicht des Flächeninhaltes und des Holzertrages der Staatsforsten.** [Areas and yields of Prussian state forests.] Deutsch. Forstzeitg. **36**: 780. 1921.—The areas and yields of timber for the fiscal year 1921 are given for each of the 32 state forests From the total area of 2,442,876 hectares 9,486,111 cubic m. of wood were to be cut.—*W. N. Sparhawk.*

3688. Anonymous. **Versuche über die Entstehung von Waldbränden.** [Experiments on origin of forest fires.] Deutsch. Forstzeitg. **36**: 798–799. 1921.—Several foresters contradict the statements made by Reinhardt in an article under this title in a recent issue of the Deutsche Forstzeitung.—*W. N. Sparhawk.*

3689. Anonymous. **Zur Forststatistik in Slowenien.** [Forest statistics in Jugo-Slavia.] Wien. Allg. Forst. u. Jagd Zeitg. **39**: 237. 1921.—Forest statistics for all the states which make up the Kindgom of the Serbs, Croats, and Slovenes are available for 1920. The forest area amounts to 42.5 per cent of the total area of the kingdom. Of this area 3.11 per cent are forests under state control, 5.83 per cent are communal forests while 91.06 per cent are privately owned. Forest holdings in excess of 50 hectares are in the hands of 579 owners, who control 29 per cent of the forested area, the remaining 71 per cent are in the hands of the thousands of small owners. The forests are 39 per cent coniferous, 33 per cent broadleaf, and 28 per cent mixed. Fifty-four per cent of the area is managed on the selection system with almost 41 per cent on the clean cutting system, 3 per cent coppice, and 2 per cent coppice with standards.—*F. S. Baker.*

3690. Anonymous. **Zur Holzproduktion Italiens.** [The wood production of Italy.] Wien. Allg. Forst u. Jagd Zeitg. **39:** 161–162. 1921.—Even before the war only 15.9 per cent of Italy was forested. During the war cutting was heavy, and great destruction occurred in the Alpine portion of northeastern Italy. It is doubtful whether successful replanting can be done on these devastated areas except at prohibitive costs. Forest devastation is common all over Italy, as well as on the island of Sardinia. The Italian Tourist Club is striving to awaken public opinion, and improvement is expected in the near future. Austria is at present exporting considerable lumber to Italy.—*F. S. Baker.*

3691. A. **Die Aufforstung von Grundstücken.** [The afforestation of agricultural land.] Deutsch. Forstzeitg. **36:** 898. 1921.—A proposed Bavarian law would restrict the afforestation of land used for agriculture. From 1903 to 1912, 11,998 hectares of such land were afforested, of which 4,288 were good agricultural land, the rest comparatively inferior. More than half of the total was the work of peasant owners of small tracts. The withdrawal of this land from agriculture is deemed contrary to the public interest.—*W. N. Sparhawk.*

3692. Anderson, H. M. **Survey of the township of Owens, in District of Timiskaming.** Ann. Rept. Minister Lands, Forests and Mines, Ontario **1918:** 82–84. 1919.—Fully 90 per cent of this township is suitable for farming as the land is well drained and tillable, the soil being a loose-textured clay loam. The timber is almost entirely spruce with some large poplar on the uplands. Along the streams there are large white spruce while the remainder of the timber is suitable for pulpwood.—*A. W. McCallum.*

3693. Anderson, M. L. **Branch growth of Douglas fir.** Trans. Roy. Scottish Arbor. Soc. **35:** 144–147. 1921.—Measurements show an annual branch growth of 6 inches in length and $\frac{4}{80}$ inch in diameter in one plantation and 15 inches in length and $\frac{9}{80}$ inch in diameter in the other. The spacing of trees in the former was $4\frac{1}{2} \times 4\frac{1}{2}$ feet, in the latter $3\frac{1}{2} \times 3\frac{1}{2}$ feet. Despite a closer planting distance, the branch growth is stronger in the latter plantation. The rate of branch growth is more dependent upon the quality of the site than upon planting distance.—*C. R. Tillotson.*

3694. Anderson, Mark L. **On planting distances for conifers.** Trans. Roy. Scottish Arbor. Soc. **35:** 16–25. 1921.—The author discusses the silvicultural and financial aspects of close versus wide spacing in forest plantations.—*C. R. Tillotson.*

3695. Appel, Conrad. **Vorläufige Ernteberícht der Forstsamen. Werke Conrad Appel, Darmstadt. [Predictions regarding crops of forest seeds.]** Forstwiss. Centralbl. **43:** 440. 1921.

3696. Badoux, H. **Le pin Weymouth (Pinus Strobus) en Suisse (suite). [The Weymouth pine (Pinus Strobus) in Switzerland (continued).** Jour. Forest. Suisse **72:** 148–152. 1921.—The article describes numerous plantations of *Pinus Strobus* in Switzerland, gives their age, number of trees, the range in diameters and heights, and the production in cubic m. Comparisons are made with the native species, generally to their disadvantage. The sale value and uses are given.—*W. C. Lowdermilk.*

3697. Badoux, H. **Le pin Weymouth (Pinus Strobus) en Suisse (suite et fin). [The Weymouth pine (Pinus Strobus) in Switzerland (concluded).]** Jour. Forest. Suisse **72:** 165–173. 1921.—This installment deals with the enemies of *Pinus Strobus*, the most dangerous being blister rust (*Cronartium ribicola* Dietr.) Originating in Europe, the disease spread until it was necessary generally to stop the planting of this tree. In 1904, the disease appeared in Switzerland and has since extended over the entire country. Remedies are specified for the disease. Control investigations were conducted in the Arboretum de Groenendael near Brussels. A 10 per cent solution of potassium permanganate proved most effective in curing affected trees. *Agaricus melleus* Wahl and *Trametes radiciperda* R. Hartig are other fungal diseases of the pine.

Pinus Strobus is well suited to the level country despite the blister rust attacks. Its growth is superior to the indigenous species, it reproduces naturally, and its wood is highly valued. It is recommended for high forests.—*W. C. Lowdermilk.*

3698. Barbey, A. Un incendie forestier dans l'Esterel. [A forest fire in l'Esterel.] Jour. Forest. Suisse 72: 141–148. *2 pl.* 1921.—The disasterous forest fire which started July 26, 1918, occasioned the study of the causes of fires, of the rapid spread, and of the type of damage done in the dry coastal region of the Mediterranean Sea. The most common cause is the carelessness of smokers and other pedestrians in the forest. Incendarism is uncommon. The scarcity of rainfall, the type of ground cover, both dead and living, particularly the action of the dry hot wind (the Mistral), broken pieces of glass bottles acting as lenses, lightning, and, quite rarely, meteorites are responsible for fire. The spread of fire is favored by the dense growth of underbrush under the maritime pine, and cork oak stands aid the rapid progress of fires. Fire lanes (10–50 m. wide) are useless under these circumstances. The action of the hot wind (Mistral) may be sufficient to make human efforts at suppression ineffective. The best measure against conflagrations is to maintain an even forest cover by means of selection cutting.—*W. C. Lowdermilk.*

3699. Bates, Carlos G., and Alfred J. Henry. **Streamflow experiment at Wagon Wheel Gap, Colorado.** Monthly Weather Rev. Suppl. 17. *55 p., frontispiece, fig. 1–41.* 1922.—The preliminary report on the termination of the first stage of the experiment on the effect of forests on streamflow gives an analysis of the climatic and streamflow data obtained. Two areas of nearly the same size, location and topography, have been observed for 8 years. One of the areas is now to be denuded. It has been found possible to calculate the discharge of the area to be denuded from the data obtained on the area to be kept covered. The analysis of the streamflow is made on a basis of the effect of cover conditions, precipitation, snow cover, and temperature.—*E. N. Munns.*

3700. Beatty, David. **Re-survey of the township of O'Brien, District of Algoma.** Ann. Rept. Minister Lands, Forests and Mines, Ontario 1918: 81–82. 1919.—From the point of view of agriculture this is one of the best townships in northern Ontario. All the large timber has been taken out for railroad construction work, but in the northern and southern portions there is timber suitable for pulpwood.—*A. W. McCallum.*

3701. Beatty, David. **Survey of the township of Williamson, in the District of Algoma.** Ann. Rept. Minister Lands, Forests and Mines, Ontario 1919: 78–79. 1920.—About 6 per cent of this township has been burned over but the remainder is well timbered. About half the area is covered with spruce swamp with deep moss, the timber being 4–7 inches in diameter. The remainder of the township is wooded with spruce, poplar, balsam, and white birch 4–12 inches in diameter.—The soil is clay for the most part, about 50 per cent of the area being covered with moss from 6 inches to 2 feet in depth.—*A. W. McCallum.*

3702. Beatty, Herbert J. **Survey of certain township outlines in the District of Timiskaming.** Ann. Rept. Minister Lands, Forests and Mines, Ontario 1919: 62–65. 1920.—The timber is chiefly spruce of pulpwood size with scattered stands of jack pine and poplar. A considerable portion of this area has been burned over, some of it during the present season.—About half of the soil is clay suitable for agriculture while the remainder is sandy.—*A. W. McCallum.*

3703. Beatty, Herbert J. **Survey of the township outlines on the south side of upper Abitibi Lake, in the District of Timiskaming.** Ann. Rept. Minister Lands, Forests and Mines, Ontario 1918: 84–86. 1919.—This area is chiefly valuable for its spruce timber, and there is not sufficient arable land to warrant development along agricultural lines.—*A. W. McCallum.*

3704. Bell, J. P. F. **The advantages of shelter belts.** Trans. Roy. Scottish Arbor. Soc. 35: 106–111. 1921.—The advantages of shelter belts to livestock, methods of formation, choice of species, cost, etc., are discussed.—*C. R. Tillotson.*

3705. Bennett, W. H. **The economical production of commercial timber crops.** Quart. Jour. Forest. 15: 252–261. 1921.—A discussion, with figures, is presented of initial and final costs of plantations and the spacings to which European larch, Douglas fir, Corsican pine, Scotch pine, Norway spruce, and Sitka spruce seem adapted.—*C. R. Tillotson.*

3706. Bingham, E. R. **Survey of base and meridian lines in the District of Thunder Bay.** Ann. Rept. Minister Lands, Forests and Mines, Ontario 1919: 70–72. 1920.—The whole area has been logged at a comparatively recent date and most of it has been burned over. There is practically no timber of commercial value left, the principal trees being small birch and poplar.—The greater part of the land is rocky, sometimes bare but usually with a shallow covering of leafy loam. There are some agricultural areas in which the soil is either a white to light brown clay or a clay loam.—*A. W. McCallum.*

3707. Blair, R. J. **Pulp storage in water.** [Abstract.] Phytopathology 12: 60. 1922.

3708. Bruce, Donald. **The relative cost of making logs from small and large timber.** California Agric. Exp. Sta. Bull. 339. *317–333.* 1922.—It costs 3 times as much per M. B. M. to make logs from 18 inch as from 48 inch trees. Below 18 inch diameter the costs rise rapidly with each further decrease in size.—*A. R. C. Haas.*

3709. Cavana and Watson. **Survey of township outlines in the District of Sudbury.** Ann. Rept. Minister Lands, Forests and Mines, Ontario, 1919: 92–94. 1920.—In isolated areas there are stands of heavy timber, chiefly jack pine. The tree growth is generally small. This condition may possibly be due to a hard, impenetrable subsoil which makes the trees very liable to wind throw after they have reached a height of 20–30 feet. A small block of red and white pine was observed.—*A. W. McCallum.*

3710. Code, T. G. **Traverse survey of the Opazatika River and Lakes, Pishkanogama Lake, Ground Hog and Horwood Lake and Sahkatawichtah River and Lake.** Ann. Rept. Minister Lands, Forests and Mines, Ontario 1919: 87–91. 1920.—The shores of these rivers and lakes are fairly well timbered with jack pine, spruce, balsam, poplar, and birch. There are also some large burned areas. On the banks of the Ground Hog River there was a good deal of ash up to 10 inches in diameter. On the shores of Horwood Lake some red pine was seen.—*A. W. McCallum.*

3711. Crouch, M. E. **Survey of the outlines of the Pic River pulpwood and timber limit, District of Thunder Bay.** Ann. Rept. Minister Lands, Forests and Mines, Ontario 1919: 84–86. 1920.—The prevailing timber in this area is spruce, balsam, birch, and poplar, though none seen was of commercial importance. No white or red pine was seen. Only a small amount of jack pine was observed. The land is generally rocky with small intervening areas of clay or sandy soil.—*A. W. McCallum.*

3712. Cunliffe, N. **The Douglas fir aphis.** Quart. Jour. Forest 15: 157–159. 1921.—The life history of this insect (*Chermes cooleyi* Gill.) as it is known in England and Scotland is discussed. A method of control is given.—*C. R. Tillotson.*

3713. Dacy, G. H. **Lessening lumber losses. Some of the ways in which wood wastes are saved and put to work.** Sci. Amer. 126: 42–43. *4 fig.* 1922.

3714. Denham, H. J. **A note on the fall of winged seed.** Quart. Jour. Forest. 15: 247–252. 1921.—Many problems of regeneration hinge on the distance to which forest tree seed may be carried by the wind. Experiments, admittedly incomplete, conducted to determine the rate of fall of 18 species of tree seed indicate velocities varying from 0.7 to 1.48 m. per second. Assuming that Scotch pine seed, which falls at an average rate of 0.72 m. per second, is dispersed from a cone 20 m. above the ground, it will take it 27 seconds to reach the earth. If propelled laterally at the same time by a steady wind of 25 km. per hour, it will travel to a point at ground level 187.5 m. distant. Upward currents of air, moreover, may even serve to carry seed over ridges from one valley to another.—*C. R. Tillotson.*

3715. Dobie, James S. **Survey of the township of Idington, in the District of Algoma.** Ann. Rept. Minister Lands, Forests and Mines, Ontario 1918: 86–89. 1919.—At present this area is well timbered with spruce and balsam on the low ground and with poplar and birch on the higher land. The spruce is of excellent quality for pulpwood.—*A. W. McCallum.*

3716. Drumaux, L. **Les grandes plantations de resinaux et leur risques. [The large plantations of conifers and their risks.]** Bull. Soc. Centrale Forest. Belgique 24: 288–292. 1921.—Extensive even-aged plantations of conifers are subject to destruction by fire and to excessive damage by insects. Uneven aged stands of conifers intermixed with broad-leaved species are recommended.—*W. C. Lowdermilk.*

3717. E., P. **Die Bewaldungsverhältnisse der Mittelmeerländer. [The forests of the Mediterranean region.]** Wien. Allg. Forst u. Jagd Zeitg. 39: 209–211, 215–216, 221–222. 1921. —A popular description is presented of the forests of southern Spain and France, Italy, Greece, western Asia Minor, Palestine, and the north African coast lands. A general description of topographic and climatic features is given, also the altitudinal sequence of forest types, chief species, and their relations. The status of forestry in each country and the chief features of the lumber trade are discussed. The wide distribution of the Mediterranean evergreen chaparral type is stressed and the essential similarity of other types in many lands is recognized.—*F. S. Baker.*

3718. Eberhard, J. **Begriffliches: Dauerwald-Blendersaumschlag. [The meaning of Dauerwald and Blendersaumschlag.]** Forstwiss. Centralbl. 43: 441–448. 1921.—The writer discusses Wagner's criticism of Fabricius' statement that "Plenterwald" and "Dauerwald" are the same thing, and also that "Blendersaumschlag" and "Saumfemelschlag" are identical. He points out that there are 2 distinct forms of selection cutting, one (Blenderschlag) taking only mature trees, the other (Femelschlag) cutting in all age classes. Dauerwald is not necessarily selection forest, according to Wagner. The so-called selection cutting of the Blendersaumschlag is more like a shelterwood cutting. [See also Bot. Absts. 11, Entry 3721.]—*W. N. Sparhawk.*

3719. Eschenlohr, Hans. **Die Anfänge einer geordneten Forstwirtschaft im Hoheitsgebiet der freien Reichstadt Memmingen. [Beginnings of forestry in Memmingen.]** Forstwiss. Centralbl. 43: 297–319. 1921.—An account is given of the methods of forest management and silviculture introduced in the forests under the control of the free city of Memmingen (Swabia) by Michael Schwegelin, who had charge of them from 1540 to 1583. It is also told how since the middle of the 13th century conifers (chiefly *Picea excelsa*) have been encroaching on the hardwood areas (chiefly beech and oak) in spite of measures taken to prevent it.—*W. N. Sparhawk.*

3720. Fabricius. **Neuzeitliche Forstwirtschaft. [Present day forestry.]** Wien. Allg. Forst u. Jagd. Zeitg. 39: 173–174. 1921.—A controversorial discussion of an earlier article by Kubelka [see Bot. Absts. 10, Entry 1018].—*F. S. Baker.*

3721. Fabricius. **Zur Abwehr. [In self defense.]** Forstwiss. Centralbl. 43: 401–412. 1921.—This is a reply to Christoph Wagner's criticism of Fabricius' statement that "Dauerwald" is the same thing as "Plenterwald," and that the "Blendersaumschlag" of Wagner is only another name for the old "Saumfemelschlag." In support of this assertion Fabricius lists the different silvicultural systems under 3 main heads—clear cutting, shelterwood cutting, and selection cutting—and the several variations in system under each. He says that Wagner's system is not one to be used generally, because it means a reduction in annual increment and a greater capital outlay, besides being unnecessary to secure satisfactory reproduction. [See also Bot. Absts. 11, Entry 3718.]—*W. N. Sparhawk.*

3722. Freudenberg, K., und H. Walpuski. **Der Gerbstoff der Edelkastanie 8. Mitteilung über Gerbstoffe und ähnliche Verbindungen. [The tannin of the true chestnut 8. Contributions concerning tannins and similar compounds.]** Ber. Deutsch. Chem. Ges. **54**: 1695–1700. 1921.—The tannin found in the leaves, wood, and bark of the true chestnut (*Castanea vesca*) is the same. The crude tannin is a mixture which upon hydrolysis yields quercitin, traces of gallic acid, about 2 per cent sugar (mainly glucose), and traces of non-aromatic oxy-acids.—*Henry Schmitz.*

3723. Fröhlich, Jul. **Einiges über die Waldwirtschaft in Siebenbürgen. [Forestry in Transylvania.]** Wien. Allg. Forst u. Jagd Zeitg. **40**: 26–27. 1922.—The transfer of Transylvania from Hungary to Rumania has added to the latter about 5½ million acres of forest land, 4 million covered with broadleaf species and 1½ million with conifers. About 4 million acres are under state administration, the remainder being private forests. Before railroads penetrated this province it was heavily forested with valuable timber, but since about 1800 it has been exploited, especially for high grade oak used for staves, interior trim, and cabinet making. In the '90s the common forests, state lands, and corporation holdings were put under government management to stop forest devastation. A shelterwood system was prescribed but it failed, and as a result reproduction is today spotty and unsatisfactory. The valuable oak has given way to inferior species such as beech and sprout hornbeam. On private holdings conditions were worse than under state supervision; today most of them are covered with brush and hornbean, and furnish only sheep and goat pasturage. Disastrous floods have originated on these areas. In 1918, state control was extended to private lands but little was done on account of the war. The first need is the control of all forest lands to secure good reproduction of valuable species, even if artificial reforestation must be resorted to. Culture of oak in small pure stands is advocated.—*F. S. Baker.*

3724. Glorie, H. **La forêt de Houthulst. [The forest of Houthulst.]** Bull. Soc. Centrale Forest. Belgique **24**: 213–217, 274–283. 1921.—The history of this ancient forest is begun.—*W. C. Lowdermilk.*

3725. Godbersen. **Erhalten oder Verzehren? [Conservation or destruction?)** Zeitschr. Forst- u. Jagdw. **53**: 449–454. 1921.—The Prussian state administration has instituted a system of strict financial rotation in its pine forests which will cut into the stored-up capital in order to help relieve the present intense financial burden of the state. This policy, which looks to the present rather than the future, is one which should be avoided as past history has proved. Reference is made especially to Hartig's firm resistance to the cutting of state forests after the Napoleonic wars and Reus's efforts and success in building up the wood capital on the state forests. Although the financial rotation is mathematically unassailable, it does not consider the fact that economic conditions are not governed by mathematical formulae, and that any attempt to establish economic measures by the use of such formulae is subject to errors. It can be demonstrated that the average value increment per cent for the years 1900–1910 justified the retention of such stands of mature, non- or low-increment producing stands the removal of which according to the principles of financial rotation appeared to be an urgent necessity.—*J. Roeser, Jr.*

3726. Harrer. **Produktionssteigerung in der Forstwirtschaft. [Increasing forest production.]** Forstwiss. Centralbl. **43**: 449–468. 1921.—Suggestions are made for increasing the productivity of German forests. Great increases are possible because now not only the average yields per acre in different states vary widely, but also the average yield for different forms of ownership within individual states. If the average yield of all German forests were brought up to that of the state forests, it would no longer be necessary to import wood.—All seed used should come not only from the proper localities but should also be taken from selected well-formed trees of rapid growth. Clear cutting over large areas should be abandoned and one of the several systems of "continuous forest" adopted instead. Construction of roads, etc., will make it possible to utilize intermediate yields from thinnings, which now can not be done in many instances. A measure deserving of very serious consideration is the extensive use of exotic species of rapid growth, especially Douglas fir (*Pseudotsuga*), which on similar sites produces much greater yields than any of the native species. Tables and curves of diameter, height, and volume growth are given which indicate that the species does as well in Germany as on the corresponding sites in western North America. Other measures deserving consideration are: the production within the country of various materials, such as pulpwood and charcoal wood instead of firewood; the production of tanbark and alcohol; and the extinction of various rights of user which hinder proper forest management.—*W. N. Sparhawk.*

3727. Hausendorf. **Der Langenbrander Schirmkeilschlag von Forstmeister Dr. Eberhard und der Wagnersche Blendersaumschlag in Gaildorf. [The Langenbrand shelterwood wedge system of deputy forest conservator Dr. Eberhard and the Wagner border strip felling in Gaildorf.]** Zeitschr. Forst- u. Jagdw. 53: 474–482. *Fig. 1–3.* 1921.—Witzbach and the author visited both areas, Witzbach preferring Eberhard's system. Hausendorf finds no comparison since it is not possible to compare an organic whole, such as the border strip system, with a part of such a whole, such as the wedge system, the only object of which is to secure improved methods of removing timber from the forest. Wagner's system secures removal and reproduction by cutting across the width of each compartment from the north; while Eberhard's system, after the forest has been built up by repeated thinnings to a shelterwood stand, starts the process of removal from the center of the compartment by a small tongue-like felling, which is gradually widened out wedge like to the sides of the compartment, the point of the wedge being against the wind. Wagner's system, often erroneously called a reproduction system, has as its chief object wood production through the continuous care and building up of the wood capital; it combines all desirable management features and may be considered a form of the continuous management system. Eberhard's system on the other hand seeks to secure as rapid removal and regeneration as possible; it cuts into the wood capital but does not improve the silvicultural condition of the forest. It is not as Eberhard designates it a modern, economic, continuous management system.—*J. Roeser, Jr.*

3728. Herrmann. **Bericht über die Waldsamenernte für 1921. [Information regarding the 1921 crop of forest tree seeds.]** Deutsch. Forstzeitg. 36: 785–787. 1921.—Data are given regarding the seed crop of all the common species, compiled from questionnaires returned from nearly all the forest regions of Germany.—*W. N. Sparhawk.*

3729. Hiley, W. E. **Recent investigations on the germination and culture of forest seeds.** Quart. Jour. Forest. 15: 160–168. 1921.—The number of seedlings per 100 seed obtained on the average from a sowing in a nursery is called the "plant per cent." With Norway spruce it may be as high as 50 but is more generally nearer 20 per cent. With Scotch pine it is generally 10–20 per cent, and with larch less than 10 per cent. The ungerminated seed consists of empty seed, parasitized seed, seed which has germinated feebly and died, and seed which appears sound but fails to germinate. In spruce, Scotch pine, and Douglas fir the bulk of the ungerminated seed is of the last class. If submitted to optimum germination conditions many of these seed germinate. The percentage of seed germinating under optimum conditions is called the "germination percentage" or "germination capacity." For spruce this is frequently above 90 per cent, for pine 80 per cent, and for larch generally not more than 50 per cent. Expressing the plant per cent in terms of the germination capacity, the highest per cent obtained by Bühler for spruce was 49, for Scotch pine 24, and for larch 18; most results are much lower than these. Since it is generally believed that most seed which germinate slowly in laboratory tests either fail to germinate or produce poor plants under nursery conditions, the custom has arisen of setting a time limit upon germination tests and disregarding for nursery purposes all seed which does not germinate 80 per cent in 10 days, Sitka spruce and Corsican pine 70 per cent in 20 days, Scotch pine 80 per cent in 20 days, Douglas fir 60 per cent in 20 days, and larch 40 per cent in 20 days. Weymouth pine does not complete germination until after 100 days and sugar pine generally shows a germination of less than 1 per cent in 30 days. Experiments indicate that seed which normally germinates in the 1st year may also undergo a process of after-ripening. Thus with freshly-gathered spruce seed it has been found that a 4-hour exposure to 122°F. raised the germination percentage from 21 to 96. Similar seed kept over until the following summer gave over 90 per cent germination without any heating. Bühler carried out extensive experiments on nursery practice which indicate that the highest number of first quality plants per yard of drill was secured through sowing 0.33 ounce Norway spruce, 0.33 ounce Scotch pine, 1.5 ounce European larch, and 2.2 ounces silver fir. On the square yard basis the sowing should be 1 ounce of spruce and pine. Forest litter proved the best cover for spruce and pine, and clay for larch and fir. The best depth of sowing was 0.4–0.8 inch for spruce and pine, 0.2–0.4 inch for larch, and 1.0 inch for fir. A covering of 1 inch was sufficient to entirely prevent larch germination.—*C. R. Tillotson.*

3730. Hobart, Hampden A. G. **Continental notes. France.** Trans. Roy. Scottish Arbor. Soc. 35: 50–56. 1921.—An account is given of the forest of Haguenau, the most famous forest in Alsace, including description of conditions and method of management, with results.—*C. R. Tillotson.*

3731. Hobley, C. W. **On Baobabs and ruins.** Jour. East Africa and Uganda Nat. Hist. Soc. 17. *75–77.* 1922.—A discussion is given of the relation of the Baobab to the domestic life of the natives and thus to its distribution around villages and ruins.—*Wm. Randolph Taylor.*

3732. Junack. **Organisationen der forstlichen Berufe. [Organizations in the forest profession.]** Zeitschr. Forst- u. Jagdw. **53**: 278–286. 1921.—The author discusses the progress of organizing the various branches of the forest profession and outlines a plan for organization to include all elements of private and public forest practice. Organizations are forming almost daily but there is lack of leadership and a definite plan to secure uniformity throughout the country. Efforts should be directed toward the formation of a universal German forest society.—*J. Roeser, Jr.*

3733. Kahl. **Ernteaussichten für Waldsämereien im Herbst 1921. [Prospects for forest seed crops in fall of 1921.]** Forstwiss. Centralbl. **43**: 438–440. 1921.—The official data are presented regarding seed crops in Germany of the principal forest trees, including 3 conifers and 15 hardwoods. In general, the crop is poor for all species.—*W. N. Sparhawk.*

3734. Kay, James. **Petawawa Experiment Forest Station.** Trans. Roy. Scottish Arbor. Soc. **35**: 167–173. 1921.—The author describes methods used in laying out sample plots at this station (which was established in 1918) and considers the classification of trees there and the various degrees or systems of thinning operations.—*C. R. Tillotson.*

3735. Keudell, von. **Hohenlübbichower Forst-Kultur-Methoden. [Forest cultural methods.]** Deutsch. Forstzeitg. **36**: 849–851. 1921.—Methods of plowing and harrowing, both before and after afforestation of old fields and reforestation of clear-cut areas, are described. These measures resulted in better survival of young trees, less damage by frosts and disease, and more rapid growth.—*W. N. Sparhawk.*

3736. Kressmann, F. W. **The manufacture of ethyl alcohol from wood waste.** U. S. Dept. Agric. Bull. 983. *100 p., pl. 1–3, fig. 1–10.* 1922.—Data are presented regarding amount of wood waste, history of process, and method of procedure. The temperature and pressure of cooking should not exceed 7.5 atmospheres and should be reached as quickly as possible (15–20 min.) and maintained for 15–20 minutes. The ratio of water to dry wood should be 125: 100, and of sulphuric acid to dry wood, 1.8–2: 100. Under these conditions the yield of 190 proof alcohol will be 25 gallons per dry ton.—*Ira C. Swanman.*

3737. Kreutzer, E. **Neue Durchforstungsgrundsätze.** [New principles of thinning.] Wien. Allg. Forst- u. Jagd Zeitg. **39**: 57–58. 1921. [An elaboration of a previous article of the same title (see Bot. Absts. 9 Entry 717).]—Several errors in the tabular matter and text of the earlier article are pointed out. The basis of the new system lies in the use of a spacing index (W) which is fairly constant for all ages above 30 years and varies but little with site. This index equals height (H) divided by crown spread (S) as found empirically in stands of proper development. This figure is usually about 6. Number of trees per acre (N) equals areas divided by the square of crown spread (S^2). S^2 can be replaced by $\frac{H^2}{W}$ in this equation, making the normal number of trees per acre in the stand dependent only upon the value of H, which can easily be ascertained, and the arbitrarily chosen spacing index (usually 6). The formula becomes $N = \frac{Area \times W^2}{H^2}$.—*F. S. Baker.*

3738. Kreutzer, E. **Zum Thema "Dauerwald."** ["Continuous" forest.] Wien. Allg. Forst-u. Jagd Zeitg. **39**: 259–260. 1921.—"Dauerwald" is a form of management practically identical with the selection system in its original form. It is preeminently a natural system of management, laying more stress upon the preservation of soil values and maintenance of good cover than the technical considerations of rotation, financial income, etc. The system was developed at Bärenthorn on a sandy area covered by Scotch pine stands of poor quality resulting from a clear cutting and planting policy. The rotation is "commercial" not financial. Trees are cut at a specified size rather than a certain age and furnish greater quantities of large sized timbers that are in demand. Less clear length lumbers is produced. The "continuous" forest system may be best on poor soils but its financial returns are still in question.—*F. S. Baker.*

3739. Kreutzer, E. **Zur Kohlensäure-Assimilation unser Waldbäume.** [Carbon dioxide assimilation of forest trees.] Wien. Allg. Forst- u. Jagd Zeitg. **40**: 13–14. 1922.—The hypothesis has been advanced that growth of trees is determined by the limited amounts of carbon dioxide available, and that by increasing this gas, growth can be greatly accelerated. The theory that water and soil salts are disproportionately abundant in forest soils and can never be limiting factors has been used to explain the rapid growth secured by von Kalitsch under his "continuous" system of management. This point of view is shown to be untenable; instead, improvements in soil and moisture conditions, which influence turgor and vigor, really explain the increased growth.—*F. S. Baker.*

3740. Lang, Ross, and Ramsey. **Survey of the township of Cumming, District of Algoma.** Ann. Rept. Minister Lands, Forests and Mines, Ontario **1919**: 86–87. 1920.—The timber in this township is nearly all spruce with some poplar and birch on the ridges. Some cedar occurs in the swamps.—The whole township is fairly level and the soil is clay or clay loam.—*A. W. McCallum.*

3741. Larsen, J. A. **Weather records at lookout stations in northern Idaho.** Monthly Weather Rev. **50**: 13–14. 1922.—Weather conditions at high and low mountain stations show there is greater wind movement, higher temperatures, and lower humidity during the afternoons at the lower than at the higher elevations. This is of great importance in forest fires.—*E. N. Munns.*

3742. Leven, George. **Japanese larch (Larix leptolepis) and the new disease.** Trans. Roy. Scottish Arbor. Soc. **35**: 118–121. 1921.—Three fairly well-defined types of Japanese larch appear among the immature specimens of Japanese larch in plantations, the fissure-barked, the flake-barked, and the smooth-barked. These vary not only in their bark characteristics but to some extent in their habits of growth and their frequency. The suggestion occurs that the bark modifications serve to protect the cambium from various injuries. No specimens of the flake-barked type injured by *Phomopsis* sp. have come under the writer's observation while numerous stems of each of the other 2 types have been observed badly affected by the disease.—*C. R. Tillotson.*

3743. Locker. **Alpe, Wald und Weide. [Alpine pasture lands and forests.]** Wien. Allg. Forst u. Jagd Zeitg. **39**: 192–193. 1921.—Food-stuff production is urgent in Austria and has lead to overgrazing on the alpine meadows. There is a tendency to favor pasturelands over woodlands. Grazing is sufficiently heavy in alpine woodlands to destroy much of the reproduction. The forage production in such places is small. The damage to the forest is not offset by the value of the grazing. Game preserves in these regions are usually overstocked, and the tree damage in them is as great as when domestic stock is grazed. There is urgent need to emphasize the indirect as well as the direct benefits of alpine forests at this time.—*F. S. Baker.*

3744. Löffelmann. **Fichtenwirtschaft im Erzgebirge. [Spruce management in the Erzgebirge.]** Wien. Allg. Forst u. Jagd Zeitg. **39**: 265–267, 277–278, 289–291. 1921.—The Erzgebirge (Saxony) present a difficult field for the culture of crops; both soil and climatic conditions are unfavorable. Unusual methods of forest planting have been developed, especially upon mountainous sites. In the valleys the usual system of hole planting is practiced but on the heights the "hill system" is used. Hills of soil 40–50 cm. high are built up from rich soil brought from moist pockets the fall before planting. The following spring a tree is planted upon each hill. In frost holes these hills are made much larger. At high elevations where the ground is occupied by brush, strips are cleared about 1½ m. apart and the brush is laid top down upon the uncut brush in adjoining strips. In these cleared strips, hills of soil are built up and planted the following spring. The method is very expensive but successful. The hills keep the trees above the frost level, eliminate competition for many years, and help protect the trees from the snow fungus (*Herpotrychia nigra*). Close spacing is not profitable in this system. In the valleys the trees are spaced much closer to keep down weeds by shading. This necessitates early thinning, advantageously done by cutting the spruce for Christmas trees leaving stumps 1 m. high; the branches left on these stumps shade the ground effectively for some time.—White pine (*Pinus Strobus*) does excellently throughout the spruce zone and endures dryness and excessive soil moisture better than spruce. In wet sites natural reproduction is often superior to clean cutting and planting, for clean cutting has the effect of so raising the water table that even with hill planting root decay is frequent, which later may cause decay of the bole.—Natural reproduction of spruce is difficult in the Erzgebirge on account of poor soil conditions. The summer temperatures are abnormally low for central Europe which, with other climatic factors, tends to prevent the formation of a deep forest mould upon which reproduction takes place readily. Natural reproduction must be secured through careful preparation. Partial strip cuttings, with the maintenance of windbreaks on the north and west sides, are used frequently. This stimulates reproduction and conserves soil moisture. In better sites patches may be cut clean or left with a few trees in the middle. These patches are usually oval in outline to prevent the full exposure of the middle to sunlight (3 tree lengths by ½ a tree length).—*F. S. Baker.*

3745. Lotbinière, H. G. J. de. **Methods of cheap planting.** Quart. Jour. Forest. **15**: 174–178. 1921.—The author discusses measures which will effect cheap planting, the advantages and disadvantages of each, and costs.—*C. R. Tillotson.*

3746. McAuslan and Anderson. **Survey of certain township outlines in the District of Algoma.** Ann. Rept. Minister Lands, Forests and Mines, Ontario **1919**: 61–62. 1920.—About 40 per cent of the eastern portion of the land has been burned over within the last 15–20 years, and on it occurs a thick growth of poplar, birch, spruce, and jack pine. On the remainder of the area there are some good stands of white spruce, black spruce, balsam, birch, and cedar.—The area is composed chiefly of clay soil slightly broken with rock ridges and swamps. The swamps, which are underlain by very fertile soil, could be drained.—*A. W. McCallum.*

3747. MARSHALL, R. C. **Costing and costs of formation.** Quart. Jour. Forest. **15**: 242–247. 1921.—A discussion is presented of the elements that enter into the costs of forest plantations and suggestions as to means of minimizing these costs.—*C. R. Tillotson.*

3748. MICKLITZ, TH. **Anbau stickstoffsammelnder Gewächse in Kulturorten mit armen Böden.** [Cultivation of nitrogen collecting plants on sites with poor soils.] Wien. Allg. Forst- u. Jagd Zeitg. **39**: 169. 1921.—In many places in Bohemia and Austria, spruce (*Picea excelsa*) is managed in pure stands on a clean cutting system on lands originally bearing hardwoods. The intensive utilization and artificial handling are impoverishing the soil so that reproduction is secured with difficulty and the honey agaric (*Agaricus melleus*) and the nun moth (*Liparis monacha*) are destroying the weakened stands at an ever increasing rate. The planting of locust (*Robinia pseudacacia*) is recommended as the best means of resupplying these soils with nitrogen. Where spruce is planted near locust trees on poor soils more rapid growth and more healthy color are clearly evident. This is particularly true on sandy soils. On heath soils inclined to be acid, white pine (*Pinus Strobus*) grows better with the locust than does spruce. On wet sites white alder (*Alnus incana*) is effective in increasing the nitrogen content of the soil.—*F. S. Baker.*

3749. MONROY, J. A. **Ein Beitrag zur Dünenaufforstung.** [A note on afforestation of dunes.] Forstwiss. Centralbl. **43**: 470–473. 1921.—After smoothing and fixing the seaward side of dunes by planting grasses and sedges, and after checking movement on the crests by inserting pine boughs, conifers should be planted on the inland slopes. Scrub pine (*Pinus montana*) and pitch pine (*P. rigida*) greatly stimulate the growth of *P. silvestris* and should be planted in the ratio of 1 to 4 of the latter species. On more moist sites just behind the dunes, beech or Douglas fir may be planted.—*W. N. Sparhawk.*

3750. MORRIS, J. L. **Survey of the township of Kapuskasing, District of Algoma.** Ann. Rept. Minister Lands, Forests and Mines, Ontario 1918: 79–80. 1919.—This township is covered with a good stand of timber suitable for pulpwood. It is chiefly spruce 4–9 inches in in diameter with scattered areas of poplar, balsam, white birch, and cedar 5–15 inches in diameter. As the greater portion of the township is swampy it is not fitted for agricultural development.—*A. W. McCallum.*

3751. MULFORD, F. L. **Transplanting.** Amer. Forest. **28**: 238–243. *8 fig.* 1922.

3752. NECHLEBA. **Versuche der Bekämpfung der Nonne mit chemischen Mitteln (Insektiziden).** [Experiments in combatting the nun moth with insecticides.] Wien. Allg. Forst- u. Jagd Zeitg. **39**: 174. 1921.—Hydrocyanic acid gas at 0.5 per cent concentration by volume is fatal with 45 minute exposures and at 3 per cent concentration in 10 minutes. It is impossible to use this in practice however as the gas kills all foliage and the necessary concentrations can not be maintained in open air. Schweinfurth's green and a barium compound "Nematin" used as sprays were almost useless due to poor adhesion and unpalatability. The addition of 5 per cent molasses helps and this with 0.3 per cent Schweinfurth's green killed 83 per cent of the nun moths (*Liparis monacha*) while 2 per cent "Nematin" killed 64 per cent. Carbolineum emulsion as a contact poison was not effective in concentrations below 10 per cent; at the latter concentration it killed 60 per cent.—*F. S. Baker.*

3753. P., J. **Boisements des hautes fanges dominales du Hertogenwald.** [Afforesting the highland bogs of the Hertogenwald.] Bull. Soc. Centrale Forest. Belgique **24**: 217–220. 1921.—The great thickness of the peat layers of the highland bogs makes forest plantations unprofitable. Only below 600 m. and with a peat layer no thicker than 0.50 m. can plantations be recommended.—*W. C. Lowdermilk.*

3754. Pack, A. N. **A seven hundred year logging company.** Amer. Forest. **28:** 195–198. *12 fig.* 1922.—Forestry practice in a privately owned tract of 12,000 acres in the Black Forest of Germany is described.—*Chas. H. Otis.*

3755. Patten, T. J. **Survey of a meridian line in the District of Kenora.** Ann. Rept. Minister Lands, Forests and Mines, Ontario **1919:** 73–74. 1920.—The country is timbered with jack pine, balsam, and poplar on the high land, with large black spruce in the lower tracts.—The soil on about half of the area is clay and on the remainder occur rocky ridges with sand boulders and gravel intervening.—*A. W. McCallum.*

3756. Peutz, Von. **Die Entwicklung der Klenganstalten in den letzten 25 Jahren. [The development of seed extracting establishments in the last 25 years.]** Zeitschr. Forst- u. Jagdw. **53:** 257–277. *Charts 1–5.* 1921.—A description of the seed extracting establishments of Eberswald, Annaburg, and Klausenau constructed within the past 25 years shows the progress of improvement from the compartment of box type of kiln to the cylindrical kiln with preliminary drying chambers. Haack's experiments established that the injury to the seed by the heat in drying is directly proportional to the percentage of moisture in the cone. This work more or less revolutionized the industry. The source of seed should be known and collections from different sources kept separate. Small extracting establishments are, therefore, desirable and to avoid the old compartment form a "safety seed extracting kiln" has been placed on the market for small operators; this is described in detail with a chart.—*J. Roeser, Jr.*

3757. Phillips and Benner. **Survey of the Black Sturgeon River pulp and timber limit in the District of Kenora.** Ann. Rept. Minister Lands, Forests and Mines, Ontario **1919:** 74–77. 1920.—This area is nearly all well timbered, only a small portion being recently burned. On the higher lands are birch, spruce, jack pine, and poplar, with spruce predominant on the lowland. No white pine of value was seen.—For the most part the soil is good, being a sandy loam. The remainder is either swamp land or rocky soil.—*A. W. McCallum.*

3758. Pollanetz. **Neben Kulturen der Forstwirtschaft. [Secondary products of forestry.]** Wien. Allg. Forst- u. Jagd Zeitg. **40:** 19–20. 1922.—It is now necessary to make the forests of Austria, especially small holdings, productive to the highest degree. The returns may be increased by utilizing secondary forest crops. These include the cultivation of wild rose seedlings (for nursery budding stock), growing rhododendrons and azaleas, ferns, and medicinal plants, especially digitalis and belladonna. Mushrooms and wild berries can also be handled at a profit. The cities always furnish good markets for edelweiss and alpine roses which may be grown in connection with forests at high elevation.—*F. S. Baker.*

3759. Poskin, A. **Influence des forêts sur le régime des eaux. [Influence of forests on stream flow.]** [Rev. of: Engler, A. **Untersuchungen über den Einfluss des Waldes auf den Stand der Gewasser. (Studies on the influence of forests on stream flow.)** Mitteil. Schweiz. Zentralanst. Forst. Versuchsw. **12:** 1–626. *58 pl., 127 tables.* 1919 (see Bot. Absts. 9, Entry 710).] Bull. Soc. Centrale Forest. Belgique **24:** 292–298. 1921.

3760. Pratt, E. R. **Stainy or butterfly markings on willow timber.** Quart. Jour. Forest. **15:** 186–190. *2 pl.* 1921.—Nearly all willow timber now produced is more or less faintly marked by slight stains which arise from the entry of water, sometimes through knots or wounds but principally through minute horizontal cracks in the bark. The water enters into the cambium and brings with it a little of the tannin from the bark. The rising and falling sap spreads the stain up and down and after several years the figure very much resembles that of a butterfly or moth. It is unlikely that the stain causes any deterioration in the quality of the timber.—*C. R. Tillotson.*

3761. Pulling, A. V. S. **Simple forest conservation.** Amer. Forest. 28: 211–217. *13 fig.* 1922.—Shingles, news-print paper, painting, cross-ties, and building lumbers are concerned.—*Chas. H. Otis.*

3762. Py, A. **Le hêtre à la Vallé de Joux.** [The beech in the Joux River valley.] Jour. Forest. Suisse 72: 162–165. 1921.—Contrary to the former report on beech, *Fagus silvatica* is found at the higher elevation in the forest of the valley of the Joux. On the ridge of Carroz and of Burlignière, at elevations ranging from 1100 to 1300 m., occur large trees not over 100 years old. The general scarcity of the beech may be due to cutting for charcoal.—*W. C. Lowdermilk.*

3763. Record, S. J. **Novel trees and forest products.** Amer. Forest. 28: 235–237. *6 fig.* 1922.—The author describes the making of clothing from wood, wood strains, plugging holes in crossties, and the pine-straw roads of Florida.—*Chas. H. Otis.*

3764. Richardson, H. G. **Some remarks on British forest history.** Trans. Roy. Scottish Arbor. Soc. 35: 157–167. 1921.—The author discourses on British forest history of the Middle Ages.—*C. R. Tillotson.*

3765. Rosemann. **Allerlei Fragen und Folgerungen zum "Dauerwald."** [Concerning the "Dauerwald."] Deutsch. Forstzeitg. 37: 41–45. 1922.—The "Dauerwald" differs from the "Plenterwald," or selection forest, in that cuttings in the latter are governed by the needs of the stand alone, with only incidental regard to the needs of the soil, while in the former the the main consideration is to maintain or create soil conditions favoring best stand development. In the ordinary even-aged forests there is usually a period of about 6 years after planting before the young stand forms a continuous cover, followed by a period (15th–30th year), before thinnings commence, when the stand is too crowded; these conditions result in deterioration of the site and a considerable lost increment. Rosemann believes, however, that the abandonment of the generally prevailing clear-cutting system would not be wise, because the Dauerwald system has not been given a thorough trial, requires constant careful technical supervision, and, contrary to the claims of its advocate, would result in greater fire hazard. Clear-cutting, followed by soil cultivation, with improvement cuttings in the 15th and 20th year, leaving the felled material to enrich the soil, and regular thinnings every 5 years after the 25th, with natural reproduction, will accomplish all that is claimed for the Dauerwald, without its disadvantages.—*W. N. Sparhawk.*

3766. Rowe, M. H. **The intermediate treatment of woodlands.** Quart. Jour. Forest. 15: 179–186. 1921.—The author discusses the causes of the open nature of the elder type of British woods (forests) and the silvicultural methods of treating woods to make them most productive and to keep them in the best condition.—*C. R. Tillotson.*

3767. Rubner. **Ökologische und pflanzengeographische Lichtfragen.** [Ecological and phytogeographical problems of light.] Forstwiss. Centralbl. 43: 327–345. 1921.—The work during the last decade of various investigators on light in relation to forest growth is discussed. Seven phases of the problem are considered: (1) tolerant and intolerant species; (2) light and germination; (3) light, ground flora, and reproduction; (4) light and form of crown; (5) variation in light-climate according to latitude and altitude; (6) forest trees and light-climate; (7) volume production and energy of light rays.—Especially noteworthy under (1) is the work of Wiesner on minimum light utilization, and on the basis of his work as well as that of Oelkers, Knuchel, Boysen, Jensen, and Bühler, the writer considers that the conception of tolerants and intolerants is justified, in spite of the ideas to the contrary advanced by Borggreve, Fricke, and Max Wagner.—Under (2) the work of Haak, Kinzel, and Bühler on the effects of light intensity, color of light rays, and duration of lighting on the germination of seeds is discussed, especially interesting being the fact that such effects are very striking, and that seeds of different species respond in different ways.—Little has been done since the work of Cieslar on the 3rd subject, but more should be done, because of the relation of light intensity to tree reproduction as well as to the density and composition of the ground cover, which may seriously affect tree reproduction by competing with it for light and moisture.—Under (4) mention is made of trees with drooping branches, adapted to utilize all the available light, and pyramidal trees with upright branches, adapted to lower latitudes where sunlight is intense.—While the length of summer days increases with latitude, light rays strike the ground more obliquely and consequently with less warmth, and moreover the blue rays are much reduced. At high altitudes, on the contrary, the proportion of blue rays and the intensity of direct light are greater, resulting in a greater variety of plants but much less height growth, except on steep slopes, where the arctic regions get more direct light and warmth than the high altitudes.—Wiesner found that light requirements of given species increase northward, and that crowns tend to change in form, with fewer branch orders and more open foliage. The pyramidal form is also common both at high latitudes and at high altitudes. It is important from the forester's standpoint that the more tolerant strains of a given species, developed under certain geographical conditions, have a better stem-form than the less tolerant strains.—Max Wagner's conclusion that volume production per unit area decreases toward the north because of decreasing energy of the sun's rays is incorrect because he doesn't take the decreasing precipitation into account. Both factors may have some influence on yields.—*W. N. Sparhawk.*

3768. RUBNER. [Rev. of: HEINKINHEIMO, OLLI. **Der Einfluss der Brandwirtschaft auf die Wälder Finnlands. (Effect of the broadcast burning practice on Finland's forests.)** Arbeit. Forstwiss. Ges. Finnland **4**: 1915.] Forstwiss. Centralbl. **43**: 345–353. 1921.—The reviewer presents a summary of the book, which discusses the practice once prevalent, not only in Finland but also in parts of Sweden and Russia, of cutting and burning extensive areas of forest in order to cultivate the soil, and the effects of this on the composition and character of the forests. On frequently burned lands the alder predominates; on land burned less often, birch; on land burned only occasionally, pine; white spruce predominates only on land that has not been handled in this way.—Though the book has little significance for modern forest practice, it is of value for its treatment of the biological basis of silviculture, and especially of the natural competition of species. While the author mentions occurrence of seed years, disseminative powers of the seed, sprouting capacity, and juvenile height growth as important factors in the competition, he does not mention susceptibility to late frosts or tolerance, both of which have much to do with the distribution of spruce. Especially noteworthy are the data regarding sprouting capacity of the birches, alder, and aspen.—*W. N. Sparhawk.*

3769. SCHENKA. **Anregungen zur Führung eines Merkbuches auf der Försterei mit einigen Entwürtfen dazu. [Suggestions for a record-book for forest ranger districts.]** Deutsch. Forstzeitg. **36**: 769–771. 1921.—Forms are suggested for recording personnel data, work accomplished, results of management, and other data.—*W. N. Sparhawk.*

3770. SCHMIEDEBACH, O. **Die topographische Grundkarte und die Forstwirtschaft. [Topographical soil charts and forest management.]** Zeitschr. Forst- u. Jagdw. **53**: 501–502. 1921.—There is an urgent national economic and technical demand for a revision of the present topographic charts. More minute and careful detail, with especial reference to a larger number of measured points of elevation, is suggested. The writer recommends 150–350 points of elevation per square km. and a scale of 1: 10,000 as sufficient for the technical application of the topographic (height-line) charts in the management of forests.—*J. Roeser, Jr.*

3771. SCHRÖDER. **Die Erziehung der Rotbuche in reinen Beständen und in Mischung mit Eiche und Esche. [Growing beech in pure stands and in mixture with oak and ash.]** Deutsch. Forstzeitg. **37**: 273–277. 1922.—Cultural methods described consist principally of thinnings, improvement cuttings, and lightcuttings begun at a very early age and repeated every few years to favor the final cut and at the same time maintain favorable soil conditions.—*W. N. Sparhawk.*

3772. Schubert, J. **Zur Inhaltsberechnung von Baumstämmen. [Volume calculation of tree stems.]** Zeitschr. Forst- u. Jagdw. 53: 482–486. *Fig. 1–3.* 1921.—A discussion is presented of the accurate measurement of stem contents with the use of the 2 Gauss formulae. —*J. Roeser, Jr.*

3773. Schüpfer. [Rev. of: Hufnagel, Leopold. **Praktische Forsteinrichtung. [Practical forest regulation.]** *3rd ed.* Wilhelm Frick: Leipzig and Vienna, 1921.] Forstwiss. Centralbl. 43: 436–437. 1921.—The book treats the problems of forest regulation in a brief, easily understandable, and thoroughly practical way.—*W. N. Sparhawk.*

3774. Schwappach. [Rev. of: **Rate of growth of conifers in the British Isles.** Forest. Commission [Great Britian] Bull. 3. *86 p.* 1920.] Zeitschr. Forst- u. Jagdw. 53: 179–182. 1921.—The author discusses briefly the English war method of securing data for the preparation of growth and yield tables. He presents 2 tables comparing the yield of Scotch pine and fir stands in Great Britain and in Germany for the oldest age classes in the English tables and the yield of Douglas fir stands of 15, 30, and 45 year age classes in England and Germany. Pine thrives better in Germany than in England, but fir and Douglas fir grow better in England and Scotland.—*J. Roeser, Jr.*

3775. Seeholzer. **Natürliche Bestandsbegrundung. [Natural establishment of stands.]** Forstwiss. Centralbl. 43: 412–420. 1921.—The author, referring especially to the new shelterwood system of silviculture advocated by many foresters, points out that there can be no one best system, and that methods of treatment must be adapted to widely varying local conditions. He illustrates his contention by describing the unsatisfactory results of shelterwood cuttings on 2 forests with which he is familiar. Spruce, especially, gives poor results with this method.—*W. N. Sparhawk.*

3776. Seydel, H. von., Schröder, Hildebrandt, und Schwappach. **Zum Anbau der Bankskiefer in reinen Beständen. [Growing Banks' pine in pure stands.]** Deutsch. Forstzeitg. 37: 331–333. 1922.—These foresters agree that Banks' pine (jack pine, *Pinus Banksiana, P. divaricata*) is not to be considered as a forest crop except on the very poorest sites, and even there other species, such as *P. silvestris*, should be introduced under shelter of the jack pine as soon as the site conditions will permit. Jack pine makes a desirable nurse tree to assist the establishment of more exacting species on unfavorable sites, and is also useful for filling openings in Scotch pine stands because of its rapid height growth. Schwappach recommends the use of pitch pine (*P. rigida*) in mixture with Scotch pine on poor sites as it tends to improve soil conditions and dies out after a few years, thus automatically accomplishing the thinning that is needed on such sites.—*W. N. Sparhawk.*

3777. Speight and VanNostrand. **Survey of certain township outlines in the District of Sudbury and Timiskaming.** Ann. Rept. Minister Lands, Forests and Mines, Ontario 1919: 58–61. 1920.—Much of the area covered has been burned over within recent years but there are still some good stands of timber. Along both banks of the Nat River occurs a considerable area of exceptionally fine jack pine (*Pinus Banksiana*). There is a great deal of spruce of pulpwood size, also balsam, scattered Norway pine (*Pinus resinosa*), poplar, and birch.—Light clay soil intersected by sandy ridges covers a large proportion of this area.—*A. W. McCallum.*

3778. Stamminger. **Neuzeitlicher Ausbau der Holzverwertung auf gemeinsame Grundlage. [Revision of timber valuation on a uniform basis.]** Forstwiss. Centralbl. 43: 361–376. 1921.—The great diversity of grades now recognized in the timber trade, for the different species and for different states of Germany, should be replaced by one uniform set of grades for all species, based on sizes and quality of the wood. Moreover, a uniform base price should be established for each grade, and current prices in different localities should be expressed in terms of the base price. It is also desirable that uniform standard forms of sale contract be adopted, in order that price quotations for different localities or for different periods may be comparable for use in statistical work. A standard method of grading is outlined, and suggestions are given regarding terms of sale.—*W. N. Sparhawk.*

3779. Stiebner. **Einiges über den Zweck des Bauernwaldes und die Vorbedingungen zu besserer Waldwirstchaft.** [Concerning peasant woodlots and better forestry.] Wien. Allg. Forst- u. Jagd Zeitg. 39: 291. 1921.—The inefficiency of small woodlots as producers of wood is often cited as an example of mismanagement. While state forests produce 4 cubic m. of wood per hectare per year, the woodlots produce but ½ cubic m. They are primarily producers of litter (leaves, faggots, etc.), and timber is a by-product. The remedy is not political and can not be effected by laws or the union of these small holdings into communal forests unless they are managed by trained men who will make timber growing the first consideration, but so manage the forest that the peasants will still obtain litter annually.—*F. S. Baker.*

3780. Stirling. **Planting distance for Douglas fir.** Trans. Roy. Scottish Arbor. Soc. **35.** 9–15. 1921.—The planting of Douglas fir and Sitka spruce in mixture with slower-growing conifers is considered a waste of time and money. Sooner or later the Douglas fir or Sitka spruce suppresses and crowds out the slower-growing trees before the latter have any value as thinnings or have had any effect in suppressing the side branches of the former. The result is the same as if the fir and spruce had originally been given a wide spacing. For the production of pit wood a spacing of 7 feet has been suggested. For the production of the best quality of timber a much closer spacing is desirable. Close spacing only partially restrains branch growth. If clean boles are required, hand pruning must be undertaken. Natural cleaning of stems begins at an age of about 40 years.—*C. R. Tillotson.*

3781. Story, Fraser. **The forests of Bialowieska.** Quart. Jour. Forest. **15:** 169–173. 1921.—A description is given of this forest situated in the middle of the Russian province of Grodno. It was preserved by the Czar for the chase, and thus affords a particularly good example of a natural forest of that region.—*C. R. Tillotson.*

3782. Sutcliffe and Neelands. **Survey of township outlines between Ground Hog and Kapuskasing rivers, in the District of Timiskaming.** Ann. Rept. Minister Lands, Forests and Mines, Ontario **1919:** 80–83. 1920.—The eastern part of the area surveyed was burned 20–30 years ago but is being rapidly reforested with birch, poplar, spruce, and jack pine. Some good jack pine stands suitable for tie timber escaped fire. In the western portion of the area the timber is large and dense, being composed of spruce, balsam, balm of Gilead, poplar, birch, and cedar. Some white pine and jack pine are also present.—*A. W. McCallum.*

3783. Tillotson, C. R. **Storage of coniferous tree seeds.** Jour. Agric. Res. **22:** 479–510. 1921 [1922].—Seeds of the following species were stored under a variety of conditions: *Pinus contorta, P. ponderosa, P. monticola, P. Strobus, Picea Engelmanni, Pseudotsuga taxifolia.* The details of the experiments are shown in graphs and extensive tables. Seed thoroughly air dried and stored in air-tight containers kept best throughout the 5 years of the experiment. Under such conditions temperature and geographic location of storage are of little consequence. The germinative energy as well as germinative ability of seeds stored in air-tight containers is superior, even after only 1 year of storage, to that of seed stored in paraffined paper, paper, cloth, and oiled cloth bags. The sequence represents the order of merit of the containers included in the test. Rapid deterioration goes on in any of these containers, except the air-tight one, so that after 1 or 2 years the seeds of Englemann spruce, Douglas fir, and whitepine are practically worthless.—Storage at "room" temperature is superior to storage at fluctuating or fairly uniform low temperatures. For ordinary storage, locations of relatively high altitude and low relative humidity are best.—The sustained vitality of the seeds tested is in the following order, the strongest being mentioned first: *Pinus ponderosa, P. contorta, P. monticola, P. Strobus, Picea Engelmanni, Pseudotsuga taxifolia.*—*D. Reddick.*

3784. Weber, Heinrich Wilhelm. **Die Gliederung unserer Wissenschaft in eine Produktionslehre und eine Betriebslehre, ihre Geschichte und ihre kritische Würdigung. [Classification of the science of forestry.]** Forstwiss. Centralbl. **43**: 281–289, 391–399, 421–435. 1921.—Weber discusses the various conceptions of forestry as a biological science and as an economic science, and concludes that there has been a tendency to over-emphasize the idea of financial profit in producing material goods (timber) while forgetting the real purpose of creating cultural values, which include both material and imponderable products. He classifies forestry into 3 phases: the science of production; the science of utilization; and the economic phase, the weighing of results against costs.—*W. N. Sparhawk.*

3785. Weibecke. **Ostdeutscher Kiefernwald. Seine Erneuerung und Erhaltung. [East German pine forests. Their renewal and retention.]** Zeitschr. Forst- u. Jagdw. **53**: 294–305. 1921.—Seed cultures are discussed under the subheadings (1) soils upon which sowing can be done; (2) time of sowing; and (3) the seed. Sowing of forest seed is generally practicable. Poor results are avoided to the extent that sparse and valuable humus is conserved. The necessity of planting occurs on only a small part of the cultural areas; 10 per cent of the total may be above the average. Pine seed must be planted April 10–15, preferably earlier. Nurseries should be sown about April 8 and planting should be done between March 25 and April 15, at the latest April 25. The best seed is obtained from cones allowed to open naturally and collected from fellings in advanced pole-wood and in mature stands. Seed-husking establishments find no favor with the author.—*J. Roeser, Jr.*

3786. Witzgall. **Noch einmal der Wagnersche Blendersaumschlag und der Langenbrander Schirmkeilschlag. [Note regarding Wagner's selection strip cutting and the Langenbrand shelterwood method.]** Forstwiss. Centralbl. **43**: 473–474. 1921.—It is argued that Wagner's method does not leave enough to the judgment of the forester, and the Langenbrand method also has the advantage of being a further development of an old proved method of silviculture, while Wagner's is new.—*W. N. Sparhawk.*

3787. Woolsey, T. S., Jr. **Forestry in Connecticut.** Amer. Forest. **28**: 218, 243. 1922.

3788. Zavitz, E. J. **Report of the Forestry Branch, 1918.** Ann. Rept. Minister Lands, Forests and Mines, Ontario **1918**: 142–160. *Fig. 1–10.* 1919.—An annual report with summarized statistical data is presented. Forest fires are classified as to causes. It is shown that 46.5 per cent were of railway origin, 8.2 per cent caused by campers, 8.1 per cent by settlers, and 23.2 of unknown origin.—At the Provincial Forest Station in Norfolk County 50 acres of scrub oak lands were underplanted with white pine. A preliminary survey of the sand dunes in Prince Edward County was made with a view toward reforestation.—White pine blister rust was found to be generally distributed in southern Ontario but it has not yet reached the northern part of the province. At the Provincial Forest Station 4 men worked for 4 months in eradicating *Ribes* on an area of about 100 acres which, however, was somewhat abnormal. This indicates the difficulty of carrying on such work on large areas of wild lands.—*A. W. McCallum.*

3789. Zavitz, E. J. **Report of the Forestry Branch, 1919.** Ann. Rept. Minister Lands, Forests and Mines, Ontario **1919**: 105–125. *2 fig.* 1920.—An annual report with summarized statistical data is presented. Owing to the unusual drought, fires were more numerous and of greater extent than usual. The most important causes were: railways, 37 per cent; campers, 9 per cent; settlers, 7 per cent; and unknown, 36 per cent. Summing up the fire protection situation it is concluded that fire control will not improve until it is recognized (1) "That forest protection is a specialized business requiring a permanent trained organization, and (2) that no organization can give efficient service without the adoption of the merit system in making appointments and promotions."—In Ontario the problem of reforestation has 2 distinct phases, (1) the production of continuous wood crops on the Crown lands of the Laurentian plateau in northern Ontario comprising about fifty million acres, and (2) the reforesting of the larger waste areas and the encouragement of the private woodland owner in southern Ontario. Planting cannot be considered because of the fire hazard. Adequate fire protection and regulation of cutting to secure natural regeneration are the primary requisites in this region. The establishment of demonstration forest stations to plant and manage waste lands and to supply planting stock to private owners is considered essential.—*A. W. McCallum.*

3790. Zederbauer, E. Experiments on the storage of seeds of coniferous trees. Trans. Roy. Scottish Arbor. Soc. 35: 137–147. 1921.—This is a translation of an article by the author in the Mitteilungen aus dem Forstlichen Versuchswesen Osterreichs, 1910. The outstanding conclusion appears to be in favor of a cool storeroom or ice cellar for seed storage on a large scale. Low temperatures and high air or soil humidity are factors which act favorably in natural and artificial storage.—*C. R. Tillotson.*

3791. Zucker, M. Ph. **Rotbuchenholz.** [Wood of the red beech.] Forstwiss. Centralbl. **43**: 289–297. 1921.—For centuries, beech played a very important role in Germany forestry, being valued especially for its excellent qualities as fuel wood. With the increasing use of coal, following railroad development, beech wood was less in demand, and for a time the species threatened to give way entirely to conifers. Then came the development of many industrial uses for the wood, including the bentwood chair industry, which uses in Saxony alone between 20,000 and 25,000 cubic m. a year; the children's wagon, sled, and cart industry, using 30,000 cubic m.; and the manufacture of vehicles, wooden shoes, wooden soles, heels and shoe-lasts, furniture, machinery, flooring, and woodenware. During the war a number of other uses developed, including trench boards, fuse plugs, shell boxes, and gunstocks. In 1917, beech was used for 1,236,000 gunstocks, walnut and birch for 2,027,000; in 1918, arrangements were made for the manufacture of 12,000,000 gunstocks from 3 species. Wooden soles were made at the rate of 500,000 pairs a month in 1917, and the estimated production for 1918 was 150,000,000 pairs, requiring 1,000,000 cubic m. of sawed lumber or 3,000,000 cubic m. of stemwood. A "beech-wood industries association" has recently been formed, in part to look out for adequate future supplies and to encourage increased production of the species.—*W. N. Sparhawk.*

GENETICS

Orland E. White, *Editor*

See also in this issue Entries 3273, 3279, 3286, 3295, 3302, 3334, 3343, 3347, 3365, 3379, 3393, 3442, 3451, 3625, 3949, 3986, 3996, 4027, 4028, 4055, 4074, 4207, 4210, 4221, 4223, 4226, 4232, 4249, 4557, 4679, 4683, 4686, 4692, 4796, 4885)

3792. Anonymous. [German rev. of: Fleischer, Bruno. **Untersuchung von sechs Generationen eines Geschlechtes auf das Vorkommen von myotonischer Dystrophie und anderer degenerativer Merkmale. (Investigations of six generations of a strain on the occurrence of myotonic dystrophy and other degenerative characters.)** Arch. Rass.- u. Gesellschaftsbiol. **14**: 13–38. *14 fig.* 1922.] Naturwiss. Umschau **11**: 63–64. 1922.

3793. Anonymous. [German rev. of: Haecker, Valentin. **Allgemeine Vererbungslehre. (General genetics.)** *16 × 24 cm., ix + 444 p., 149 fig.* Friedr. Vieweg & Sohn: Braunschweig, 1921.] Anat. Anzeiger **55**: 414. 1922.

3794. Anonymous. [Rev. of: Knight, M. M., Iva L. Peters, and Phyllis Blanchard. **Taboo and genetics: A study of the biological, sociological and psychological foundation of the family.** *xv + 255 p.* Kegan Paul and Co.: London; Moffat, Yard and Co.: New York, 1921 (see Bot. Absts. 11, Entry 2469).] Nature **109**: 235. 1922.

3795. Abrami, P., et G. Senevet. **A propos des gamétes du Plasmodium praecox; proportion variable des éléments mâles et femelles. [Concerning the gametes of Plasmodium praecox; variable proportions of the male and female elements.]** Bull. Soc. Pathol. Exotique

13: 167–172. 1920.—In a statistical study of the occurrence of the parasite *Plasmodium praecox* in the blood of malarial patients, the authors find that the male gametes disappear before the female gametes, a fact which they believe responsible for the discordant results of other investigators.—*A. F. Blakeslee.*

3796. Aldaba, Victor C. **The pollination of coconut.** Philippine Agric. 10: 195–207. *1 pl.* 1921.—Female flowers may be pollinated by pollen from the same tree or other trees. Observations were made on the time of shedding pollen by male flowers and the time when the stigma of the female flower is receptive. Wind and insects serve as agents in pollination. Unpollinated flowers apparently do not produce nuts. Pollen germinates in 5–30 per cent sugar solutions. Pollen remains viable 2–9 days.—*Sam F. Trelease.*

3797. Allen, Bennett M. **Influence of the thyroid gland and hypophysis upon growth and differentiation.** Jour. Heredity 12: 414–422. 1921.—The author reviews the present state of knowledge.—*Sewall Wright.*

3798. Alverdes, F. [German rev. of: Goldschmidt, Richard. **Die quantitative Grundlage von Vererbung und Artbildung. (The quantitative basis of heredity and species formation.)** *163 p., 28 fig.* Julius Springer: Berlin, 1920.] Arch. Entwicklungsmech. 50: 620–621. 1922.

3799. Alverdes, F. [German rev. of: Ružička, Vladislav. **Restitution und Vererbung Experimenteller kritischer und synthetischer Beitrag zur Frage des Determinationsproblems. (Restitution and heredity. Experimental, critical, and synthetic contribution to the problem of determination.)** Vorträge u. Aufsätze ü. Entwicklungsmech. Org. 23. *69 p.* 1919.] Arch. Entwicklungsmech. 50: 619–620. 1922.

3800. Alverdes, Friedrich. **Rassenstudien an Fischen aus dem Carlsberg-Laboratorium in Kopenhagen. [Racial studies on fish from the Carlsberg Laboratory in Copenhagen.]** Zeitschr. Indukt. Abstamm.- u. Vererb. 24: 167–169. 1920.—The paper is a brief statement of Johs. Schmidt's racial studies in fishes with especial reference to *Zoarces viviparus* [see Bot. Absts. 11, Entry 314]. Numerous "local races" occur with respect to number of vertebrae, number of rays in right pectoral fin, number of hard rays in dorsal fin, and pigment spots in dorsal fin. The investigations are directed toward discovering the role of heredity and environment in determining these local races. Influence of heredity is determined by comparing the mother with her unborn or new-born young. All of the characters noted above are numerically fully developed at birth. The influence of environment is studied by comparing population samples from various localities where conditions of salinity and temperature are known. Schmidt believes that a fish local "race" is largely a statistical conception implying a mixture of diverse genotypes, and that the average values characterizing a "race" are primarily dependent upon the quantitative proportions of the various genotypes, and secondarily on environment. Population samples from localities differing markedly in salinity may be identical while samples from localities having same salinity may not overlap at all (number of vertebrae). On the other hand, a high number of vertebrae in young from a single female is always correlated with a high maternal number. Some environmental effect is shown by transplanting populations whose average composition is known. Populations transplanted to a new location with somewhat higher temperature and lower salinity (21–12 per cent) showed an appreciable increase in number of vertebrae as compared with controls kept in the original locality.—*A. W. Bellamy.*

3801. Anderson, E. G. **The inheritance of salmon silk color in maize.** Cornell Univ. Agric. Exp. Sta. Mem. 48. *539–554. 4 pl.* 1921.—The origin and inheritance of salmon silk color in maize is described. This character is recessive to the common green color and has been given the factorial symbols *Sm sm*. The linkage relations of salmon silk with the factors *B*, *A*, *R*, *Pl*, and *Y* were tested and it was found that this character was independent of the first 3 but linked with the latter pair. A 3-point test was made of the relations of *Y*, *Pl*, and *Sm* with the following results: *Y–Pl* 29.7 per cent cross overs, *Pl–Sm* 10.01 per cent cross overs, and *Y–Sm* 36.79 per cent cross overs, their relative map order being *Y–Pl–Sm*.—*J. H. Kempton.*

3802. Ball, Gordon. **Variation in fresh-water mussels.** Ecology 3: 93–121. *6 fig.* 1922.—Eight species of fresh-water mussels from known localities were measured as to length, diameter, obesity, height, and prominence of tubercles, and these correlated with the type of environment, such as rate of stream flow. (1) Shells of the same species often change in shape according to the size of the stream in which they occur. Shells of smaller streams are less swollen than those of larger streams. (2) Certain groups of shells show this correlation much more strongly than do others; in some cases there is apparently no relation between the size of the stream and the degree of obesity. (3) Other factors in addition to the size of the stream apparently enter into the determination of the degree of obesity. (4) For most species considered, young shells are more swollen than older ones. (5) There is frequently a correlation between sex and obesity; either the male or female shell may be the more swollen. (6) In some cases the development of the tubercles is greatest in the large-stream forms; in other cases tubercle development is the same throughout the stream. (7) Usually the flattest and the most swollen forms are connected by a complete series of intergrades. It is uncertain whether or not these variations, except those connected with sex, are inherited.—*H. S. Colton.*

3803. Banta, Arthur M. **Selection in Cladocera on the basis of a physiological character.** Carnegie Inst. Washington Publ. 305. *170 p., 19 fig.* 1921.—On the basis of response to light the author selected plus and minus strains in pure lines of Cladocera (*Daphnia pulex*, *D. longispina*, *Sinocephalus expinosis*) which reproduce parthenogenetically with but 1 maturation division. Although most of these lines showed no effect of selection (and a few lines showed but a slight effect), in 1 line a very decided effect was evident. Since genetic segregations are impossible, unless by some novel unknown method, the author thinks that many small changes (mutations?) in the genetic factor or factors may account for the result of this experiment.—*H. S. Colton.*

3804. Barker, B. T. P., and G. T. Spinks. **Fruit breeding investigations.** Jour. Bath and West and Southern Counties Soc. 14: 163–172. 1920.—A preliminary note is presented on the breeding of apples, plums, cherries, currants, gooseberries, raspberries, and strawberries. —*J. I. Lauritzen.*

3805. Bateson, William. **Evolutionary faith and modern doubts.** Science 55: 55–61. 1922.—The origin of species was the baffling problem to biologists even through the period when variations were thoroughly studied. Mendelism, which was hailed as pointing to a solution, has not provided one. The evidence obtained from these sources is inapplicable to the question of origins. Emphasis is now placed upon gametes instead of zygotes, and many phenomena of genetics have been referred to details of nuclear structure. Yet variations attributed to changes in this structure are not beginnings of species. That evolution occurred is obvious, but the origin and nature of species are still mysteries. Frequent sterility of species with one another is largely ignored. Variations now arising under observation are not sterile with one another, hence are not beginnings of species. Sexual incompatibility must have been due to something gained, while variations seen to arise are with few exceptions losses. Complete knowledge of evolution awaits the production of a sterile hybrid from 2 completely fertile parents known by observation to have descended from a common origin. Specific difference probably pertains to the base upon which transferable characters now being studied by geneticists are implanted, and of that base absolutely nothing is known. —*A. Franklin Shull.*

3806. Bateson, W[illiam]. **Genetical analysis and the theory of natural selection.** Science 55: 373. 1922.—In correcting the statement made in a previous paper that Ray was the first to emphasize sterility of interspecific hybrids, the author repeats Ray's principle that all forms which might have come from the same parent belong to the same species. He reaffirms the view that paleontology delimits the outline of evolution but does not furnish evidence that can determine interspecific relationships. The central tenet of Darwinism that species are merely culminations of varietal differences is not easily reconcilable with the new knowledge.—*A. Franklin Shull.*

3807. Bather, F. A. **Biological terminology.** Nature 108: 271. 1921.—The most important problem in the study of variations is the determination of their cause. Is the germinal change sudden and the somatic change gradual? Or may the factorial change itself be gradual? May somatic modifications influence the germ cells? How is it that a factor change apparently induces an apparently harmonizing character change? Biologists see the importance of these questions but critical experiments to answer them are not easy to outline.—*L. R. Waldron.*

3808. Baur, E. **Mutanten von Antirrhinum. [Mutants of Antirrhinum.]** Zeitschr. Indukt. Abstamm.- u. Vererb. 27: 241. 1922.—The author emphasizes that in *Antirrhinum* mutations are uncommonly frequent but the majority differ so little from originating strains that they are liable to be overlooked. These small mutations are of great selection value. He considers the hypothesis of widespread constancy in pure lines as incorrect.—*J. P. Kelly.*

3809. Beattie, J. H. **Recent progress in the development of improved strains of greenhouse tomatoes, lettuce and cauliflower.** Proc. Amer. Soc. Hort. Sci. 18: 26–28. 1921 [1922]. —A report is given of material progress in the development of strains for greenhouse forcing. The commercial varieties from which strain selections have been made are Erfurt's Dwarf Forcing cauliflower, Grand Rapids lettuce, and Sterling Castle and Sunrise tomatoes.—*H. A. Jones.*

3810. Benedict, R. C. **The origin of new varieties of Nephrolepis by orthogenetic saltation. II.** Amer. Jour. Bot. 9: 140–157. *6 pl.* 1922.—The author describes reversions in *Nephrolepis exaltata*, meaning changes from progressive varieties (derived originally from *bostoniesis*, either directly or indirectly) back toward the type *bostoniensis*. Among the primary sports of *N. exaltata bostoniensis* there was a mutation of intermediate size from a dwarf, a possible reversion to a fertile condition and a reduction in stability as shown in a decrease in proportion of divided leaves. Among those sports of *bostoniensis* termed secondary (i.e., coming directly from its primary ones) there arose also forms with reduced stability and with changed stature in addition to reversions affecting degree of leaf division. Reversion was found more frequent than progressive variation.—*J. P. Kelly.*

3811. Bergstrand, H. **Sur la variation des bacteries. [On the variation of bacteria.]** Compt. Rend. Soc. Biol. 86: 492–494. 1922.—The author discusses the findings of Neisser and Marsini, 1907, in experiments on *Bacillus Coli* grown on Endo's medium, in which 2 strains of the organism appeared. From a repetition of the work and further experiment it is deduced that a single organism may give rise to at least 2 strains (in this case *A* and *B*), differing in cultural characteristics, agglutination, motility, unaffected by passage through animals, but reverting to the original strain when allowed to rest. It is the opinion of the author that bacteria do not form a special group, but a sub-class of the true fungi.—*Andrew I. Dawson.*

3812. Blaringhem, L. **Mutantes et hybrides. [Mutants and hybrids.]** Ann. Sci. Nat. Bot. X, 3: 1–31. 1921.—The author examines the literature bearing on the origin of species by mutation and by hybridization. He begins by stating the essential characteristics of De Vriesian mutation. He emphasizes the value of sharply distinguishing fluctuating variations, which are continuous and reversible, from mutations, which are discontinuous and irreversible. Four-leaved clovers may show mutation perceptible with difficulty because of the fluctuation superposed on the mutation. The simplest case of mutation is the "regressive variety," which differs from the type in a feature that follows Mendel's original scheme. The author considers such cases limited in number and does not agree with the view of universality of the Mendelian mode of transmission. The *Drosophila* work is considered as only exceptionally touching upon true Mendelian heredity. Morgan's "geographical scheme" for location of genes is considered limited to his laboratory material. Nevertheless, De Vries's use of lethal factors in recent writings shows more or less adhesion to Morgan's school. The mutations of *Oenothera Lamarckiana* are rarely "regressive" varieties but very often elementary species. Although long studied, there is difference of opinion as to the origin of *Oenothera* mutations just as there is concerning the origin of *O. Lamarckiana* itself. Other species have been found with a similar mutability. Bartlett's "mass mutation" calls for a distinction of mutations into the frequent and rare, but the former are conveniently interpreted by simple Mendelian segregation. Other *Oenothera* phenomena are interpreted by the complicated methods of Morgan. *Oenothera* facts are considered by the author to fall under all the modes of heredity recognized in his previous publication (1919) [see Bot. Absts. 4, Entry 523].—*J. P. Kelly.*

3813. Breeder, C. M. **Hermaphroditism of a croaker, Micropogon undulatus (Linnaeus).** Zoologica 2: 281–284. *1 fig.* 1922.—Among a "large number" of *M. undulatus* taken at Atlantic City, New Jersey, a specimen was found "normal in all respects" externally that could not be stripped. It appeared to be a female turgid with eggs. On dissection it showed 2 perfect ovaries and 2 perfect testes dorsal to the ovaries. "The junction of the ova, sperm and urinary ducts appeared to be at the genital pore." "Both sets of gonads seemed well developed and in the state most frequently found in normal individuals of this species taken about the same time. . . . . The testes were soft and flocculent, and easily ruptured, the milt streaming out from such injuries, but they were not quite ripe enough to strip, and the ovaries were also a little too green for that operation." The specimen appeared to be about 5 years old and therefore had passed through at least 1 spawning season. The author suggests that it may be a case of functional hermaphroditism in which the specimen might be self-fertilized or act, in cross fertilization, as either male or female. The author notes that bi-sexuality has been recorded for the following families and orders of teleosts: Cyprinidae, Clupeidae, Salmonidae, Esocidae, Poeciliidae, Gasterosteidae, Mugilidae, Percidae, Serranidae, Sparidae, Scombridae, Labridae, Squamipinnes, Gadidae, and Pleuronectidae. This case appears to be the 1st record of a case in the Sciaenidae. The specimen is deposited in the U. S. National Museum as No. 66,140.—*A. W. Bellamy.*

3814. Breslau, Mollison. [German rev. of: (1) Baur, Erwin, Eugen Fischer, und Fritz Lenz. **Grundriss der menschlichen Erblichkeitslehre und Rassenhygiene. I. Menschliche Erblichkeitslehre. (Fundamentals of human genetics and race hygiene. I. Human genetics.)** *16 × 22 cm., 305 p., 66 fig.* J. F. Lehmann: Munich, 1921. II. Lenz, Fritz. **Menschliche Auslese und Rassenhygiene. (II. Human selection and eugenics.)** *15 × 22 cm. vi + 251 p.* J. F. Lehmann: Munich, 1921.] Zeitschr. Morphol. u. Anthropol. **22**: 332–336. 1922.

3815. Bushnell, John W. **Results of selection in the Alaska pea.** Proc. Amer. Soc. Hort. Sci. 18: 41–47. 1921 [1922].—Single-plant selections of Alaska peas have isolated strains giving higher yields under experimental conditions than seed of the same variety obtained from a number of seed firms. Data presented show "that strains derived from single-plant selections in the Alaska pea possess measurable differences, differences of a genetic nature; and it is reasonable to expect that this genetic difference will result in measurable differences in yield when the strains are tested under field conditions."—*H. A. Jones.*

3816. Christie, W. **Die Vererbung gelbgestreifter Blattfarbe bei Hafer. [Inheritance of yellow-striped leaf-color in oats.]** Zeitschr. Indukt. Abstamm.-u. Vererb. 27: 134–141. *1 fig.* 1921.—From a single oat plant having prominent stripes of yellow in the leaves and sheaths, a series of naturally self-pollinated progenies were grown during several years. Both normal and striped plants appeared in the progenies, whether the mother plant was green or striped. No system of inheritance of the striping was reported.—*E. W. Lindstrom.*

3817. Collins, E. J. **Variegation and its inheritance in Chlorophytum elatum and Chlorophytum comosum.** Jour. Genetics 12: 1–17. *8 pl., 3 fig.* 1922.—Variegated (green and white) forms of *Chlorophytum elatum* and *C. comosum* are described. The nature of the growth of the green and white areas from the meristematic tissue is discussed. Green, white, and variegated seedlings arise from self-pollination, from varietal crosses, and from crosses of the species. A Mendelian analysis of the results could not be evolved. The author considers the green-white (or green and colorless plastids) pair of characters as allelomorphs but is inclined to believe that somatic segregation of these allelomorphs is a very plausible explanation for the irregular genetic results.—*E. W. Lindstrom.*

3818. Conklin, Edwin Grant. **The proposed suppression of the teaching of evolution.** Science 55: 265–266. 1922.—The origin of man from other animals is not more degrading than origin from dust. "It is mud or monkey." Other doctrines once opposed by theologists have been generally accepted. The doctrine of evolution has been generally adopted in other fields of learning, even by progressive theologists. Those who wish to change educational institutions should do so by establishing new schools to teach specified doctrines instead of limiting those now in existence.—*A. Franklin Shull.*

3819. Cunningham, J. T. **Biological terminology.** Nature 108: 368–369. 1921.—It is held that Goodrich [see Bot. Absts. 11, Entry 3843] ignores many new conceptions and results secured by new studies in heredity. Results from Mendelism show that a character may be inherited even if not possessed by either parent. It is a misuse of terms to state that all characters are acquired during the lifetime of the individual. Characters due to genetical factors are developed rather than acquired; those brought about by changed environment are acquired. Mutative evolution has but little relation to adaptation.—*L. R. Waldron.*

3820. Cunningham, J. T. **Heredity and biological terms.** Nature 106: 828–829. 1921.—The definitions held to by Sir Bryan Donkin [see Bot. Absts. 11, Entry 3828] are those generally accepted by biologists. It is not believed that the division of human characters into "innate" and "acquired" leads to confusion. It is argued that the use of the term "acquired character" has no proper biological objection. Arguments up to the present have failed to show that all characters are innate and acquired, exactly in the same sense and degree.—*L. R. Waldron.*

3821. Cunningham, J. T. **Some problems in evolution.** Nature 109: 41–42. 1922.—It is held that the term "variation" should mean the extent or degree of difference between individuals,—not a new character or assemblage of characters. Further, such variation is due to some change in the germ plasm or in the environment. It is also believed that there is no real difference between the terms "variation" and "character;" the latter is perhaps the less ambiguous of the two. Three kinds of "characters" should be distinguished. One, resulting from environment, is non- nherited. Of the 2 inherited kinds, one is adaptive and generally recapitulational; the other shows no relation to differences of habit or environment and does not recapitulate the ancestry.—*L. R. Waldron.*

3822. Cuthbertson, W. **The problem of immunity to wart disease in potatoes.** Gard. Chron. 71: 104. 1922.—The author reports on the wart reaction of 246 seedlings resulting from open-pollinated seed of seven varieties of potatoes. The numbers of non-warted and warted, respectively, were as follows: in variety President, 14:15; Priory Queen, 8:0; Favorite, 14:2; Climax, 26:2; Templar, 28:5; Admiral, 48:5; and Majestic, 38:22. There were 19 seedlings doubtful.—*J. P. Kelly.*

3823. Dalcq, Albert. **Etude de la spermatogénèse chez l'Orvet (Anguis fragilis Linn.). [Spermatogenesis of the Orvet (Anguis fragilis Linn.).]** Arch. Biol. 31: 347–452. 1921.—This study deals with 3 phases of the spermatogenesis of the Orvet (a lizard). 1. Seasonal cycle. In March the testes are filled with primary spermatocytes usually in the pachytene stage.

Early in April the formation of spermatozoa is at its height and by the end of the month is completed. In May numerous spermatogonial divisions are found. These continue during June and July, filling the tubules with young spermatocytes in various stages of synapsis. By September the lumen of the tubules is obliterated by primary spermatocytes, now in the pachytene stage; a few dividing spermatogonia are still found. The testes remain unchanged during October and November, and presumably during hibernation, though material of this period was not studied. II. Spermatogenesis. Primary spermatogonia form secondary spermatogonia and the latter form primary spermatocytes. Spermatogonia show 19 large chromosomes ("macrosomes") and a number (probably 24) of small dot-like chromosomes ("microsomes"). Primary spermatocytes show 10 large chromosomes and 12 small bodies. A heterochromosome is present which passes undivided to one pole of the cell, hence telophase stages show 9 and 10 large chromosomes, respectively, at the poles of the cell. Secondary spermatocytes show either 9 or 10 large chromosomes, which divide equationally. The microsomes are equally distributed. The sex chromosome is of the X-O type. III. Atypical cell divisions in testes are described in great detail. Triasters and tetrasters are found among dividing spermatogonia, and these lead to an unequal distribution of chromosomes in the resulting daughter cells. Many such daughters degenerate but a few live and become primary spermatocytes. The latter cells are of 2 types, giant and polynucleate, the latter being more common. The chromosome numbers are variable in these cells, an irregularity due to triasters and tetrasters in spermatogonia. Many chromosomes are without mates, appear univalent, and behave as heterochromosomes, that is, pass undivided to one pole of the spindle. Degeneration is common in these cells but a few live through the 2nd maturation division and form abnormal sperm. The author cites embryological studies which may indicate that some abnormal sperm (giant) are viable.—*T. S. Painter.*

3824. Davenport, C. B. **Report of Department of Genetics.** Carnegie Inst. Washington Yearbook **20**: 101–156. 1921.—The work of A. F. Blakeslee and collaborators on *Datura stramonium* has thrown light on the causes of De Vriesian mutation, for in both *Oenothera* and *Datura* the chromosome complex is varying. With every variation in the chromosome complex in *Datura* goes a special somatic form. The haploid chromosome number is normally 12; there were found 12 mutants due to an extra chromosome being present (simple trisomic condition), a particular mutant being apparently dependent on the reduplication of a certain one of the 12 chromosomes. Daturas with 2 extra chromosomes belonging to different pairs (double trisomic), 2 extras belonging to the same pair (simple tetrasomic), triploids, tetraploids, and other variations have been discovered. Some *Datura* mutants produce about 50 per cent sterile pollen.—Pollen sterility received special attention from J. Belling. *Portulaca* has been studied because of its frequent somatic mutation.—C. W. Metz and collaborators report that in 2 very similar *Drosophila* species, *D. melanogaster* and *D. willistoni*, studies show that the sex chromosomes do not correspond. The sex gene or differentiator has probably been transferred from the rod-like pair in the former to one of the V-shaped pairs of the latter, or *vice versa*. Twenty-seven sex-linked characters have been studied, but this group does not correspond to any of the 4 groups of *D. melanogaster*. Isolation of biotypes of a fly, *Leria pectinata*, for future genetical work has been started. Mice were exposed to X-rays and subsequently mated. In the litters from 1 of the exposed mothers, 2 young appeared with abnormal eyes. The results of experiments on the modification of germ-plasm by alcohol suggest selective elimination of certain genotypes. A metabolic sex difference in embryo doves is indicated by O. Riddle's experiments with high and low oxygen pressures, which produced differential death-rates. Riddle also found that abnormalities in the development in pigeon embryos can be traced to insufficiency of endocrine secretions, particularly of the thymus and parathyroid. A. M. Banta's researches on species of *Cladocera* gave evidence that the sex-ratio is more or less controllable, for whereas in nature few or no males occur, crowding of mothers gave 10–90 per cent males. Selection for light-reactiveness was ineffective except with favorable mutations. The degree of sex-intergradation in a certain biotype of *Cladocera* continued controllable as previously. Parasitism was found to induce sex intergradedness in one of the Cladoceras. Two strains of mice, having merely

2 pairs of factor differences, have been tested; one is cancer-susceptible, the other not. Dextral, sinistral, and neutral whirlers were found both in waltzing mice and normals recovering from etherization. E. C. MacDowell finds that in dogs timidity has an inherited basis. An analysis of data from alcoholization of rats shows that growth of alcoholized rats is retarded but the offspring grow more rapidly than the controls. Alcohol reduces the number of litters, but in later generations from alcoholized rats the normal number may reappear. H. H. Laughlin has continued his study of contrivances illustrating the genetical conceptions and formulae for calculating ancestral inheritance. He has also attempted a classification of the socially inadequate, and noted a clean-cut segregation and recombination of traits in a Hawaiian-Chinese-Irish family. H. J. Banker studied the inheritance of mental ability as measured by college scholarship grades of parents and children. Parents with high and low standing, respectively, tend to have children with corresponding standing. There was confirmation of Schuster and Elderton's data on Oxford students. A. H. Estabrook is completing final report in the cacogenic families known as the Ishmaelites, and C. B. Davenport has completed a report on measurements of 1,000,000 American recruits. J. A. Harris and others have contributed tables for predicting egg-production in fowls. Biometrical studies on plot testing, human metabolism, etc., have been continued.—*J. P. Kelly.*

3825. De Kruif, Paul H. **Change of acid agglutination optimum as index of bacterial mutation.** Jour. Gen. Physiol. 4: 387–393. 1922.—From rabbit septicemia 2 strains of bacteria (D and G) were isolated. From a single cell of D growth was obtained showing the presence of both D and G. The strains differ in cultural characteristics on artificial media and in acid agglutination by the method of Michaelis modified by Beniasch. Constancy is more strict in D than in G, which latter diverges more by passage through animals.—*Andrew I. Dawson.*

3826. Demerec, M. **Heritable characters of maize. X. Zebra striped leaves.** Jour. Heredity 12: 406–407. *1 fig.* 1921.—The author describes the origin of a chlorophyll disorder in maize in which minute yellowish dots appear in groups of transverse stripes across the blades. The banding is not a seedling disorder but makes its appearance on the later leaves, being one of those characters in which the amount of chlorophyll diminishes with the age of the plant. In a general way this variation behaves as a simple Mendelian character recessive to the normal green color, though there is some evidence for a dihybrid nature.—*J. H. Kempton.*

3827. Dendy, Arthur. **The stream of life.** Nature 108: 84–88. 1921.—A general discussion is presented. The author holds that Mendelian factors can not explain the organism as a whole.—*L. R. Waldron.*

3828. Donkin, H. Bryan. **Heredity and biological terms.** Nature 106: 758–759. 1921.—Sir Archdall Reid's contention [see Bot. Absts. 11, Entry 301] that all branches of science should adopt like classification of "characters" is upheld. Ideas held by physiologists and biologists are dissimilar at the present time. The common assumption that human characters are rigidly divisible as to their origin into 2 groups, "innate" and "acquired," is cause of much confusion. [See also Bot. Absts. 11, Entry 3820.]—*L. R. Waldron.*

3829. Douvillé, H. **Comment ont apparu certaines formes nouvelles: Rudistes et Chames, Mytilus et Dreissensia, Anomia et Paranomia.** [**How certain new forms have appeared: Rudistae and Chamidae, Mytilus and Dreissensia, Anomia and Paranomia.** Compt. Rend. Acad. Sci. Paris 172: 887–892. 1921.—The author traces the course of evolution of certain sessile bivalve molluscs from free-living ancestors. He concludes that the new forms "result from an accident, become stable by adaptation, and are perpetuated by heredity." —*H. S. Colton.*

3830. Duck, Russell W. **Mendelism in fur sheep crosses.** Jour. Heredity 12: 410-413. 1921.—Crosses between Karakul sheep and other breeds are described. The black color and the curl, density, and luster of the hair of Karakul lambs was found to be dominant over the white, straight, long, dull wool of the other breeds.—*Sewall Wright.*

3831. E. [German rev. of: Chamberlain, Charles J. **Grouping and mutation in Botrychium.** Bot. Gaz. 70: 387-398. *11 fig.* 1920 (see Bot. Absts. 7, Entry 1735).] Bot. Jahrb. 57: 45. 1922.

3832. E. [German rev. of: (1) Hayata, B. **An interpretation of Goethes Blatt in his "Metamorphose der Pflanzen," as an explanation of the principle of the natural classification of plants.** Incones Plantarum Formosanarum 10: 75-95. 1921. (2) Ibid. **The natural classification of plants, according to the dynamic system.** Ibid. 10: 97-234. 1921 (see Bot. Absts. 10, Entry 1392).] Bot. Jahrb. 57: 47-48. 1922.

3833. Emerson, R. A. **The nature of bud variations as indicated by their mode of inheritance.** Amer. Nat. 56: 64-79. 1922.—Bud variation is classed as vegetative variation in contrast with seminal variation. The general term somatic variation is considered as synonymous with bud variation if cases in which the germ tract as well as the soma is involved are not excluded. The terms somatic mutation and somatic segregation are considered as specific ones, and are not to be used interchangeably with the more general terms somatic, vegetative, or bud variation.—The actual occurrence of somatic mutation of genes is thought to be well established in *Antirrhinum*, *Mirabilis*, *Zea*, and *Portulaca*. The essential facts discovered in *Zea mays* are: (1) that the recessive pericarp-variegation gene mutates to the dominant self-color allelomorph; (2) that only 1 of the 2 variegation genes of homozygous variegated maize mutates at a given time; (3) that in heterozygous material it is always the variegation gene, never its allelomorph (white), that mutates; (4) that reverse mutations (from dominant self-color to recessive variegation) occur; and (5) that only 1 of the duplex genes in the dominant homozygous self-colored strains mutates to the recessive variegated condition at any one time.—The frequency of mutation in variegated maize is found to be accelerated in the later stages of development of the plant. This acceleration is far beyond expectation as based merely on the increase in the number of cells. The heterozygous condition in the pericarp-variegation series of colors shows a much greater frequency of mutation than does the homozygous condition. Bud variation as conditioned by somatic segregation is found in the endosperm of maize in which aberrant chromosome behavior (non-disjunction or elimination) is indicated. Cases of segregation of cytoplasmic elements in *Mirabilis*, *Pelargonium*, *Primula*, and *Zea* are reviewed. The somatic segregation in these cases is apparently conditioned by the sectorial nature of the plant tissues. Bud variations occurring in sectorial and periclinal chimeras of graft-hybrids and in *Bouvardia* are discussed. The conclusions derived from this review are that vegetative variations in plants are due to (1) somatic mutation of genes; (2) chromosome aberrations; and (3) a vegetative segregation of plastids or other cytoplasmic elements.—*E. W. Lindstrom.*

3834. Emerson, R. A., and C. B. Hutchison. **The relative frequency of crossing over in microspore and in megaspore development in maize.** Genetics 6: 417-432. 1921.—The work of previous investigators on the relative percentage of crossing over in the 2 sexes is reviewed. The authors tested the per cent of crossing over in microsporogenesis and megasporogenesis in maize using 2 sets of factors, *B*, *b* (plant color), *Lg*, *lg* (liguleless leaves), and *C*, *c* (aleurone color factor) *Sh*, *sh* (shrunken endosperm). In the test of the 1st pair, 8,122 plants were involved; in that of the latter, 22,057 seed. The 1st pair showed no significant differences between the 2 sexes whereas the latter pair showed a significantly higher rate of crossing over in megasporogenesis. This confirms the results of Kempton, who used the factors *C*, *c* and *Wx*, *wx;* but is contrary to the results of Eyster, who found a higher rate of crossing over in the male gametes. The authors conclude that the relative frequency of crossing over is not greatly different in megaspore and microspore development and that the observed differences may possibly be due to environmental conditions rather than to inherent differences in the mechanism of crossing over.—*J. H. Kempton.*

3835. Fischer, E. [German rev. of: Bauer, J. **Vorlesungen über allgemeine Konstitutions- und Vererbungslehre. (Lectures on the general science of constitution and heredity.)** Berlin, 1921.] Zeitschr. Morphol. u. Anthropol. **22:** 329–330. 1922.

3836. Fischer, E. [German rev. of: Haecker, Valentin. **Allgemeine Vererbungslehre.** (General genetics.) *16 × 24 cm., ix + 444 p., 149 fig.* Friedr. Vieweg & Sohn: Braunschweig, 1921 (see Bot. Absts. 10, Entry 92).] Zeitschr. Morphol. u. Anthropol. **22:** 330–331. 1922.

3837. Frost, Howard B. **Genetic terminology.** Amer. Nat. **55:** 567–570. 1921.—The writer believes that the genetic terms recently proposed by G. H. Shull [see Bot. Absts. 11, Entry 324] fill a real need in genetic terminology. They make for greater precision than do some of the more general terms now in use, and remove the need for long descriptive phrases in referring to various phenomena of inheritance. Since the most fundamental points in Mendel's theory, namely, segregation and recombination, have not been changed by the more recent modifications of his views, it is held permissible to retain the terms "Mendelism" and "Mendelian" for use in a broad sense.—*A. C. Fraser.*

3838. Gatenby, J. Brontë. **Hybridity and the evolution of species.** Nature **108:** 469. 1921.—J. P. Lotsy asks [Nature 108: 400–401. 1921.] whether the presence of oligopyrene and apyrene sperms in certain insects and molluscs indicates hybridity. It is pointed out that sperms in the 2 groups have different origins in respect to their atypicality. Further, there are differences in structure of the typical and atypical sperms in 2 groups of molluscs. The bearing of atypical sperms upon hybridity is not considered.—*L. R. Waldron.*

3839. Gates, R. Ruggles. **Heredity and variation.** Nature **106:** 663. 1921.—It is universally agreed that there are 2 classes of variations, germinal and somatic. The denial of this fact by Archdall Reid [see Bot. Absts. 11, Entry 302] is the most serious contradiction in which the recent discussions have placed him.—*L. R. Waldron.*

3840. Gates, R. Ruggles. **Hybridity and the evolution of species.** Nature **108:** 401. 1921—The author replies to J. P. Lotsy [see Nature 108: 400–401. 1921]. Cytological work proves that hybridity is but one cause of bad pollen. The occurrence of lethal factors in bringing about sterility may apply either to gametes or zygotes. Such factors may easily be responsible for a certain proportion of sterile pollen. The point is raised whether evolution by hybridization means simply that the intercrossing of related races is the condition in which evolution has frequently taken place or whether it means, specifically, much more than this.—*L. R. Waldron.*

3841. Goco, Lorenzo. **Pedigree selection with Native Yellow Flint corn.** Philippine Agric. **10:** 289–298. 1922.—Different ears of Native Yellow Flint corn, in the Philippines, were found to have different yielding power. The average theoretical yield per plant of all test rows in the 2nd planting exceeded the check by 4.63 gm.—*Sam F. Trelease.*

3842. Goldschmidt, Richard. **Zur Entwicklungsphysiologie der Intersexualität. [Developmental physiology of intersexuality.]** Naturwissenschaften **9:** 315–316. *2 fig.* 1921.—Development of intersexes in gypsy moth starts and proceeds as one sex to a certain stage after which characters of the other sex are developed. The degree to which the intersexual individual is like one sex depends upon the earliness or lateness of the turning point during development. The development of the sexual characters in each case is the result of the production of specific sex hormones. Two curves are given showing the progressive production of sex hormones during development in pure races and in hybrids. The 2nd figure shows the theoretical possibility of producing intersexes without hybridization by prolonging the period of development. Temperature experiments in this direction have shown some positive results.—*J. L. Collins.*

3843. Goodrich, Edwin S. **Some problems in evolution.** Nature **108**: 404–409. 1921.—Inheritance is the reappearance in offspring of an ancestral character. Inheritance of a character is not determined either by its age or its importance but by the presence of germinal factors and environmental conditions which developed the character in the ancestor. Only the germinal complex is actually transmitted. Factors are transmitted, characters are inherited. There is but one kind of character.—Variation is the extent of difference between 2 individuals or between an individual and the average of the species. Variations are of 2 kinds, 1 due to environmental changes and 1 to change in the germinal complex. Mutation, due to the latter change, will be inherited under constant conditions. Variation of the first named type is inherited (only) so long as the change of stimulus persists. Evolution is conditioned by changes in germinal factors or in environmental stimuli, or both. In a uniform environment evolution proceeds cumulatively by new adaptive mutational characters.—Environmental stimuli may be external or internal to the organism. Heritable characters appear only on conditions always fulfilled in normal environment. The real problems of inheritance deal with the nature of germinal factors and the origin of their differences. Factors of inheritance must be brought into relation with the organism as a whole and the relationship explained. How new inheritance factors are acquired and modified are fundamental problems. Variation must ultimately be due to the action of environment. Alteration of factors does not call for the Lamarckian explanation of evolution, which supposes that a character is inherited after the removal of the stimulus which called it forth in the parent.—Non-physical agencies such as mental processes do not (directly) modify or supplement physical processes. Instinctive and intelligent behavior are essentially the same but the inciting stimuli of the latter may or may not be present in the germinal complex and so is not necessarily inherited. Knowledge of the control of inheritance factors would be productive of vast results.—*L. R. Waldron.*

3844. Gowen, John W. **Inheritance in crosses of dairy and beef breeds of cattle. III. Transmission of butter-fat percentage to the first generation.** Jour. Heredity **11**: 365–376. *Fig. 18–25.* 1920.—Transmission of butter-fat percentage to cross-breds resulting from crosses among Holstein-Friesian, Aberdeen Angus, Jersey, Guernsey, and Ayrshire breeds is studied. The butter-fat percentage in the cross-breds is decreased below the intermediate, while yield of milk is above the intermediate. Relation of these facts to heterosis is discussed. These experiments show that both parents contribute to the transmission of butter-fat percentage. —*E. Roberts.*

3845. Griffee, F. **First generation corn varietal crosses.** Science **53**: 346. 1921.—Of 146 crosses, 113 exceeded the parental average in yield of grain and 84 exceeded the better parent. A cross between Minnesota No. 13 and Squaw Flint yielded 8.4 per cent more shelled corn than Minnesota No. 13. During the first 3 years of the study a strain of Minnesota No. 13 was used which had been selected for type for several years. In the latter years this strain was selected primarily for yield. The increase yield of shelled corn per acre of the F_1 cross over the better parent has averaged less for the last 2 years than for the first 4 years of the tests. The author believes that if varieties were selected primarily for yield the value of F_1 varietal crosses would be somewhat questionable.—*J. H. Kempton.*

3846. Gutherz, S. **Das Geschlechtschromosomen-Problem bei den Säugetieren und dem Menschen.** [The sex chromosome problem in mammalia and in man.] Zeitschr. Indukt. Abstamm. u. Vererb. **27**: 261–263. 1922.—The spermatogenesis of the white mouse was studied. The author was unable to identify sex chromosomes in spermatogonial and primary spermatocyte divisions, but certain nucleoli which appear during the growth period of primary spermatocytes are interpreted as sex elements. He concludes that the sex chromosomes are of the X-Y type, the 2 components being of about equal size and not sensibly different from the autosomes. The question of sex chromosomes in man is briefly discussed.—*T. S. Painter.*

3847. Gutherz, S. **Das Heterochromosomen-Problem bei den Vertebraten. Erste Mitteilung: Untersuchung der frühen Oogenese der Hauskatze. [The heterochromosome problem in vertebrates. I. Study of the early oogenesis of the domestic cat.]** Arch. Mikrosk. Anat. 94: 338–364. 1920.—Von Winiwarter and Sainmont have interpreted certain nucleoli found in the oogenesis of the cat as representing sex chromosomes. The author makes a detailed study of these nucleoli in the early oogenesis of the cat, and shows that the morphology is extremely variable and that they give an acidophilic reaction to stains. He concludes that they do not represent sex chromosomes, and that their changing form is a product of fixation.—*T. S. Painter.*

3848. Hammond, John. **Further observations on the factors controlling fertility and foetal atrophy.** Jour. Agric. Sci. **11**: 337–366. *2 pl.* 1921.—The method of investigation has been to obtain reproductive organs of pregnant animals, to count the number of corpora lutea in the ovaries, and to compare this number with the number of embryos in the uteri. In swine uteri about 20 per cent of ova are missing and 12 per cent more later become atrophic foetuses. Rabbits have similar percentages. In large litters of rabbits the average weight at birth is less than in smaller litters. The chief factor involved seems to be nutrition. This also explains the fact that large rabbit mothers tend to have young with high average weights. Nutrition also seems to play an important part in the weight at birth of swine, since large foetuses are surrounded by large membranes.—*H. L. Ibsen.*

3849. Hammond, John. **On the relative growth and development of various breeds and crosses of sheep.** Jour. Agric. Sci. **11**: 367–407. 1921.—A statistical treatment is presented of live and carcass records of fat wethers at Smithfield Club's Fat Stock Show, from 1893 to 1913 inclusive. Two classes were exhibited: (1) "under 12 months old" (average 9 months) and (2) "over 12 months old" (average 21 months). All the animals were weighed, and from these 2 sets of measurements the rate of growth has been estimated. Cross-breeds seem to grow more rapidly than pure breeds. Variability in live weight for animals 9 months old has steadily increased from 1893 to 1913, whereas for 21-months old animals there has been little change during the same period.—*H. L. Ibsen.*

3850. Hartman, Carl. **The Virginia opossum.** Jour. Heredity **12**: 471–473. *Pl. 18–19.* 1921.—The color of the Virginia opossum is usually gray. A black phase occurs throughout the range, 1 black in 10 grays in the Austin region of Texas. The author has also obtained imperfect albinoes with hair pure white but eyes merely of reduced intensity and with black in the skin. Browns with and without pigment in the overhair have also been obtained.—*Sewell Wright.*

3851. Hensen, Victor. **Der Logos der Vererbungsvorgangs. [The logos of the inheritance process.]** With mathematical appendix by P. Harzer. Pflüger's Arch. Physiol. **188**: 98–113. 1921.—The author's position regarding some important questions in genetics is stated. He believes that in the formation of different organisms the number of chromosomes is of less importance than the number, size, and shape of the chromatin granules. Cytological and mathematical proof is given for the validity of Mendel's first law (segregation), which is accounted for by the nuclear structure. In 1885 the author mentioned the operation of such a law in his Fundamentals of Inheritance. Mendel's second law (independent assortment) seems to be a contradiction of the first but may not appear as such if the second law is referred to hereditary factors in the cytoplasm. A mathematical proof of Mendel's first law is presented in the appendix.—*L. A. Waitzinger.*

3852. Heribert-Nilsson, Nils. **Selektive Verschiebung der Gametenfrequenz in einer Kreuzungspopulation von Roggen. [Selective shifting of gamete-frequency in a hybrid population of rye.]** Hereditas 2: 364–369. 1921.—The author found 1 rye plant in 1913 giving a large percentage of a dark green form free from wax bloom. These plants were isolated and allowed to cross; all gave similar progeny. In 1914 1 plant of this stock gave 5 dark green progeny, which in 1915 gave 25 similar plants and 14 glaucous vicinists (a field of ordinary rye was 20 m. away). The 14 vicinists were isolated and gave 296 glaucous to 96 green.—If the recessive class is eliminated and all other plants are crossed, F_2 will have gametes in the ratio 2:1, and a zygotic ratio of the phenotypes of 3:1; F_3 will have a gametic ratio 3:1, and zygotic 8:1; F_4, gametic 4:1, zygotic 15:1; F_n, gametic n:1, zygotic (n^2-1):1. The author's observed ratio was 1313 glaucous:24 green. The calculated ratio was 1310:27, giving a deviation of ±3, and mean error of ±5. Through such selective elimination of recessives, the percentage of recessives falls from 25 in F_2 to 1 in F_{10}, but only to 0.25 in F_{20}.—*E. E. Jones.*

3853. Hooper, J. J. **Color of cross-bred calves.** Jour. Heredity **12**: 480. 1921.—Five calves from pure-bred or high grade fawn-colored Jerseys by a black and white Holstein sire were black in color. Two were solid black, 1 had white legs, and 2 had the Holstein pattern of black and white. A calf from the reciprocal cross was solid black.—*Sewall Wright.*

3854. Hume, A. N. **An application of close breeding in corn which produces numerous albinos.** Jour. Amer. Soc. Agron. **14**: 51–53. 1922.—Albinism is apparently forced to show itself as a result of close breeding or inbreeding. The considerations presented may reinforce the idea that the usual prejudice against inbreeding and close breeding in corn and gregarious animals is founded on the apparent ill effect of such breeding upon the immediate progeny, even though such breeding in the long run may be beneficial to the race, by forcing the elimination of undesirable "genes."—*F. M. Schertz.*

3855. Hutchison, C. B. **Heritable variations in maize.** Jour. Amer. Soc. Agron. **14**: 73–78. 1922.—More than 90 distinct and heritable characters have been identified in maize and their mode of inheritance determined. Most of the characters were discovered by chance or were obtained in the classes for "freaks" at corn shows. The author instituted a systematic search of 650 strains of maize for new characters, 2110 self-pollinated ears being obtained from 468 of the 650 strains. Seedlings raised from 1872 ears of this lot showed that 36.4 per cent contained variations of some kind. Of the 1872 families 7.3 per cent contained morphological variations, of which the most numerous were dwarfs, while over 30 per cent had chlorophyll disorders of some sort. These are only seedling disorders and the list will be enlarged when plants of these families are raised to maturity. The bearing of these variations on yield is discussed and the author concludes that the system of intensive inbreeding followed by the recombination of promising strains is of practical value in yield improvement. He also believes it possible, by combining on a large scale different lines from different varieties, in double or even quadruple hybrids, to find certain combinations that would give not only better growth than any of the original varieties but which also would remain constant in subsequent generations.—*J. H. Kempton.*

3856. Jensen, E. **Om vore Rodfrugtformers Befrugtningsforhold. [On the fertilization of our root crops.]** K. Vet. og Landbohoejskole Aarsskr. **1921**: 180–217. *6 fig.* 1921. [With English summary.]—Mangold and sugar beet are pronounced cross fertilizers, seeding on isolated main stems being 4.7 without and 40.4 with artificial cross-pollination as compared with 100 for free pollination. Turnips seeded poorly after spontaneous self-pollination, considerably better following artificial self-pollination; after free pollination fertilization is accelerated, the silicules are better developed, and they contain a greater number of larger seed than is the case after self-pollination. Swedes seed well after self-pollination, and spontaneous self-pollination appears to be common. Carrot is a pronounced cross-fertilizer. Parsnip is naturally constructed for cross-pollination, but self-pollination gives a considerable amount of seed. Chicory is self-sterile.—*Ernst Gram.*

3857. Jørgensen, C. O. **Om Bestøvnings- og Befrugtningsforhold hos nogle Graesmarksbaelgplanter med Henblik paa deres Foraedling. [On pollination and fertilization in some pasture Leguminosae with regard to their improvement.]** K. Vet. Landbohoejskole Aarsskr. **1921:** 218–244. *2 fig.* 1921.—The pasture Leguminosae have entomophilous flowers and the number of insects able to pollinate is, in several cases, small. Pollination experiments carried out in 1917 showed that *Medicago lupulina* and *Anthyllis vulneraria* are self-fertile. *Medicago sativa* is self-fertile, but the flowers must be exploded either automatically or by insects. *Lotus tenuifolius* gives a good many seed after self-fertilization. *Trifolium pratense, T. repens, T. hybridum, Lotus corniculatus,* and *L. uliginosus* are self-sterile, obligatory entomophilous pollinators. Crossing between *T. pratense, T. repens,* and *T. hybridum* was not successful. Bumblebees (*Bombus*) can pollinate all the above-mentioned species and are the chief pollinators of *T. pratense.* The honeybee, *Apis mellifica,* can pollinate *T. repens* and *T. hybridum,* but cannot reach the nectar in *T. pratense;* as pollen-gatherer, however, it is of importance for the pollination. Experiments in 1917 with caged honeybees gave the following result: 100 clover-heads with 4917 flowers gave 1270 seed, 26 per cent of flowers with seed. Under natural conditions 40 heads with 2369 flowers gave 1517 seed or 64 per cent. In *Medicago sativa* the honeybee introduces the proboscis into the nectar without exploding the flower. An exception was observed between June 15 and 20; during this period 58 explosions caused by honeybees were observed with certainty. Solitary bees like *Megachile* are of great importance in the pollination especially of *Medicago sativa.* Butterflies suck honey without touching the reproductive organs and are thus without importance for pollination. The yield of seed in self-sterile plants is greatly dependent on the number of insects. Most fortunately situated are the species which the honeybee is able to pollinate, as the number of the latter can be adjusted.—*Author's abstract.*

3858. Kiesselbach, T. A. **Ear-type selection and yield of dent corn.** Jour. Amer. Soc. Agron **14:** 27–48. 1922.—Available data indicate that, within reasonable limits at least, variation in ear characters are rather neutral in their effect upon the yield of dent corn except when they are definitely linked with special adaptive growth characteristics of the plant. Thus, slender ears with smooth shallow kernels tend to be produced on early-maturing, smaller, and less rank-growing plants than are large, rough, deep-kerneled ears of the same variety. Close type selection if long continued indicates reduced productivity through an approach toward gametic purity for the selected characters. Ear characteristics are apparently disease indicators.—*F. M. Schertz.*

3859. Klatt, B. [German rev. of: Siemens, H. W. **Einführung in die allgemeine Konstitutions- und Vererbungspathologie.** (Introduction to the study of general constitutional and hereditary disease.) *229 p., 80 fig.* Julius Springer: Berlin, 1921.] Arch. Entwicklungsmech. **50:** 640–641. 1922.

3860. Küster. [German rev. of: (1) Ernst, A. **Bastardierung als Ursache der Apogamie im Pflanzenreich. Eine Hypothese zur experimentellen Vererbungs- und Abstammungslehre. (Hybridization as the cause of apogamy in the plant kingdom; an hypothesis for experimental evolution and genetics.)** *655 p., 2 pl., 172 fig.* Gustav Fischer: Jena, 1918. (2) Winkler, Hans. **Verbreitung und Ursache der Parthenogenesis im Pflanzen- und Tierreiche. (Distribution and cause of parthenogenesis in the plant and animal kingdoms.)** *231 p.* Gustav Fischer: Jena, 1920.] Arch. Entwicklungsmech. **50:** 621–622. 1922.

3861. Löbner, Max. **Die Mendelschen Vererbungsfrage in ihrer Bedeutung für die Erwerbgartenbau. [Mendel's law in commercial horticultural breeding.]** Gartenwelt **24:** 253–254, 265–267, 276–277. 1920.—A general consideration of Mendel's law in relation to horticulture is presented. Mention is made of the garden form Primadonna of the *Begonia semperflorens* group which is an F_1 generation which is repeated by seed growers every year by crossing Triumph × Luminosa; only the F_1 seeds are sold. Other garden forms of *Begonia semperflorens* are obtained yearly in this way, especially Erfordia. This commercial F_1 is uniform; the non-commercial F_2 is not uniform.—*J. C. Th. Uphof.*

3862. Lynch, Clara J. **Short ears an autosomal mutation in the house mouse.** Amer. Nat. 55: 421–426. *1 fig.* 1921.—This character is due to a recessive factor which is not sex-linked. Heterozygotes mated back to recessives gave 51 long-eared and 43 short-eared individuals.—*H. L. Ibsen.*

3863. Maas, T. G. J. A. **De bloembiologie van Hevea brasiliensis. [The floral biology of Hevea brasiliensis.]** Arch. Rubbercult. 3: 288–307. 1919.—Hevea is monoecious, both male and female flowers being borne on the same inflorescence, a panicle. The flowering of the panicle proceeds from base to tip, the male flowers opening both before and after the female flowers. Pollination is effected by insects. Much of the pollen is not viable. Self-fertility appears to be rare although the author has secured some seed by self-fertilization.—*Carl D. La Rue.*

3864. Matthaei, R. [German rev. of: Dürken, Bernhard. **Versuche über die Erblichkeit des in farbigem Lichte erworbenen Farbenkleides der Puppen von Pieris brassicae. (Studies on the inheritance of the coloration induced in the pupae of Pieris brassicae by colored light.)** Nachrichten K. Ges. Wiss. Göttingen. *13 p.* 1920.] Zeitschr. Allg. Physiol. 20: 7. 1922.

3865. Meister, G. K. **Natural hybridization of wheat and rye in Russia.** Jour. Heredity 12: 467–470. 1921.—In 1918 at the experimental station located at Saratov, Russia, many thousand natural wheat-rye hybrid plants of the F_1 generation were observed. These were in several plots of early-blooming winter varieties of wheat, amounting to 20 per cent of the plants in one plot (v. *erythrospermum*). The hybrid plants were similar to such hybrids described by others. Sterility was the rule but some seed were obtained from which later generations were grown. Fertility increased in some lines in the later generations, and segregation occurred in certain plant characters. Characteristic segregation was noted in susceptibility to *Fusarium nivale.* From plantings of many thousand seed of the 3rd and 4th generations, over 300 plants of the wheat type survived a severe winter and very dry summer indicating increased winter and perhaps drought resistance.—*C. E. Leighty.*

3866. Mendiola, Nemesio B. **Sugar cane breeding at the College of Agriculture of the Philippines.** Louisiana Planter 68: 141–143. 1922.—A discussion is presented of the methods used in saving seed and growing the seedlings, with a brief outline of some of the results that have been obtained.—*C. W. Edgerton.*

3867. Mendiola, Nemesio B. **Sugar cane breeding in the College of Agriculture.** Philippine Agric. 10: 211–218. *12 pl.* 1921.—A number of varieties have produced fertile seed, and several hundred of the seedling varieties are being tested at Los Baños and in other parts of the Philippine Islands.—*Sam F. Trelease.*

3868. Mendiola, Nemesio B. **Two years of sweet-potato breeding.** Philippine Agric. 10: 177–189. *2 pl.* 1921.—A number of varieties were propagated sexually, the sexual offspring of each variety showing great variability. Two new varieties having superior qualities were produced.—*Sam F. Trelease.*

3869. Nachtsheim. [German rev. of: Alverdes, F. **Rassen- und Artbildung. (Race and species formation.)** Abhandl. Theoret. Biol. Heft 9. *118 p.* Berlin, 1921.] Zeitschr. Allg. Physiol. 20: 4–5. 1922. [See also Bot. Absts. 11, Entry 3875.]

3870. Nachtsheim. [German rev. of: Hertwig, Paula. **Abweichende Form der Parthenogenese bei einer Mutation von Rhabditis pellio. Eine experimentell cytologische Untersuchung. (Aberrant form of parthenogenesis in a mutation of Rhabditis pellio. An experimental cytological study.)** Arch. Mikrosk. Anat. 94: 303–337. 1920.] Arch. Zellf. 16: 440–441. 1922.

3871. Nachtsheim. [German rev. of: Winge, Ø. **On the relation between number of chromosomes and number of types, in Lathyrus especially.** Jour. Genetics **8**: 133–138. *Pl. 5.* 1919 (see Bot. Absts. 3, Entry 306).] Arch. Zellf. **16**: 441–442. 1922.

3872. Nachtsheim. [German rev. of: Wodsedalek, J. E. **Studies on the cells of cattle with special reference to spermatogenesis, oogonia, and sex-determination.** Biol. Bull. **38**: 290–316. *5 pl.* 1920 (see Bot. Absts. 6, Entry 1789).] Arch. Zellf. **16**: 439–440. 1922.

3873. Ness, H. **Breeding work with blackberries and raspberries.** Jour. Heredity **12**: 449–455. *1 pl., 2 fig.* 1921.—The spineless blackberries appeared as 2 seedlings in a lot of 2,000 grown from the McDonald variety One of these seedlings was erect, the other diffuse. Four generations have been raised from the spineless-diffuse seedlings and although cross-pollination was provided against only in the F_1, the 4th generation shows 81 perfectly smooth with all characters of the original, 59 not smooth but otherwise typical, and 60 not smooth and of a different type. A cross between the Spineless erect and Early Harvest showed the spineless form to be dominant. The F_1 selfed gave 77 spineless and 130 with spines though none of the spineless plants was absolutely smooth. Crosses between Early Harvest ♂ (*Rubus floridus*) and the Mayes dewberry ♀ (*R. baileyanus* × *floridus*) showed the characteristics of the latter to be almost perfectly dominant. Twenty-eight F_1 plants were grown and 1 individual showing the characters of both parents was protected from foreign pollen. An F_2 of 425 individuals was raised from this plant. Of these, 367 had characteristics of the Mayes dewberry, 37 were intermediate, and 21 resembled the Early Harvest and showed a high degree of sterility even when cross-pollination was permitted. Attempts to make the reciprocal cross Early Harvest ♀ by Mayes ♂ were unsuccessful and the author notes that the flowers of Early Harvest are strictly self-fertile and generally self-fertilized.—Crosses between the Mammoth and Dallas varieties of blackberries produced many floral abnormalities in both the 1st and 2nd generations. Numerous attempts were made to cross blackberries and raspberries but none was successful until seedlings of *Rubus rubrisetus* were used as the female parent. In the F_1 plants of the cross between the Louisiana dewberry (*Rubus rubrisetus*) and the red raspberries (*R. strigosus*) all characters of the red raspberry were strictly dominant. The plants were almost completely sterile, only a few irregularly distributed drupelets being set on each receptacle. Second generations were raised in 1913 and 1914 but no individuals more fertile than the F_1 appeared. In 1915 another F_2 was raised from open-pollinated F_1 plants. Upon reaching maturity these F_2 plants were classified into 28 per cent raspberry, 41 per cent Louisiana dewberry, 22 per cent intermediate, and 3 per cent indefinable. The raspberry group was readily subdivided into a robust and a very weak group. Among the robust plants 5 very fertile ones were found. The progeny of these plants offer many advantages for commercial fruits.—*J. H. Kempton.*

3874. Pratje, A. [German rev. of: Kammerer, P. **Geschlechtsbestimmung und Geschlechtsverwandlung. Zwei gemeinverständliche Vorträge. (Sex determination and sex modification. Two popular lectures.)** *240 p.* Perles: Vienna, 1918.] Arch. Entwicklungsmech. **50**: 639–640. 1922.

3875. Prell, H. [German rev. of: Alverdes, F. **Rassen- und Artbildung. (Race and species formation.)** Abhandl. Theoret. Biol. Heft 9. *118 p.* Berlin, 1921.] Arch. Entwicklungsmech. **50**: 624–625. 1922. [See also Bot. Absts. 11, Entry 3869.]

3876. Richey, F. D. **The experimental basis for the present status of corn breeding.** Jour. Amer. Soc. Agron. **14**: 1–17. 1922.—The basic principles are: (1) Selection, because it produces larger yields as it results in better adaptation to the specific environment or picks out the more favorable hybrid combinations. Selection inevitably results in decreased vigor, and consequently in decreased yield, whenever it tends toward the isolation of pure lines. (2) Hybridization, which results in increased vigor. Corn-breeding investigations at present point to pure-line methods as the only sound basis for real improvement. A large bibliography is appended.—*F. M. Schertz.*

3877. Richey, F. D. **The use of the greenhouse in corn breeding.** Jour. Heredity **12**: 393–396. *1 pl., 1 fig.* 1921.—The author suggests the use of the greenhouse as a means of getting 2 generations per year in following the system of intensive inbreeding in maize.—*J. H. Kempton.*

3878. Richter, Alwin. **Gefranste Cyklamen. [Crested Cyclamen.]** Gartenwelt **26**: 184–185. *6 fig.* 1922.—Richter, in Dresden-Striesen, bred crested varieties of Cyclamen for many years. Plants from seed are at present very constant as to color and shape of flower. Recently a flowering individual appeared, 11 flowers of which were lemon yellow and 2 partly yellow and partly light salmon-red. As the plants did not develop good pollen the variety Helllachs was used as pollen parent. The ripe fruits were upright instead of drooping. Forty small seed were gathered; no further results are mentioned.—*J. C. Th. Uphof.*

3879. Roberts, Elmer. **Fertility in Shropshire sheep.** Jour. Agric. Res. **22**: 231–234. 1921.—The author summarizes his results as follows: (1) Multiple births increase with age up to 4 years. From this point they remain fairly constant until 8 years. Beyond this age the numbers are too small to draw conclusions. (2) The age of the ram has no influence on multiple births. (3) Among Shropshire sheep more multiple births occur early in the lambing season than later. (4) Among Dorsets more multiple births occur in spring than in fall.—*H. L. Ibsen.*

3880. Saunders, Edith R. **Note on the evolution of the double stock (Matthiola incana).** Jour. Genetics **11**: 69–74. *3 fig.* 1921.—The evidence now available favors the view that the double-flowered stock arose as a mutation from the single type by 1 step, and not through a series of intermediates. While it is true that earlier descriptions and drawings of stocks would seem to indicate the existence of a semi-double form, such earlier types were undoubtedly caused by "*twinning* of the lowest flowers on the earliest flowering axis," and they cannot be classed as semi-doubles in any instance.—*A. C. Fraser.*

3881. Schellenberg, G. **Über die Verteilung der Geschlechtsorgane bei den Bryophyten. [The distribution of the sex organs in the Bryophyta.]** Beih. Bot. Centralbl. I Abt. **37**: 115–153. 1920.—The author discusses the terminology used by Lindberg and, with some modifications and additions, by later writers, for various types of arrangement of sex organs and distribution of sexual potentialities in the Bryophyta, particularly in the Musci. Especial attention is paid to the occurrence of strict dioecism (heterothallism) and of phyllodioecism which is defined to include only the condition of sexual dimorphism found by Fischer in *Macromitrium Blumei* and by Warnstorff in *Stereodon pratensis*, in which forms the small male plants develop from spores that germinate upon the female plants. The term *pseudautoecism* is applied to those cases in which the dwarf males develop by means of secondary protonemata from the female plants.—The distribution of sex organs in homothallic (monoecious) Musci is discussed in the light of the idea that the formation of archegonia requires a more abundant food supply than does the formation of antheridia. The appearance of dwarf males in phyllodioecious species, however, is held to depend not alone upon external factors, but primarily upon inherited characters.—The following terminology is proposed as covering all known forms of the distribution of sexual characters in the Bryophyta: *Heterothallism* (sexual differentiation being determined in the spores) is either *isosporous* or *heterosporous; homothallism* (the spores not sexually differentiated) includes *pseudoheterothallism* (antheridia and archegonia on separate gametophores), the variations of which are *rhizautoecism* (with persistent protonema), *eu-pseudoheterothallism* (protonema evanescent), and *pseudautoecism; homoecism* (antheridia and archegonia on the same gametophore); and *polyoecism* (antheridia and archegonia partly on the same, partly on distinct gametophores). The phylogenetic relationships of these different conditions are discussed.—In *Funaria hygrometrica*, as a rule, the main axis of the gametophore ends in an antheridial head; the archegonia are borne at the ends of lateral branches (commonly 1, occasionally 2 or several). In 1 mixed head of this species observed, the single archegonium was borne at a lower level than the group of antheridia. The archegonium in this case is interpreted as representing a lateral branch. Spores in a group of *Funaria* growing in a damp, shaded depression in a heap of compost were unusually long and profusely branched, and each branch either bore an antheridial head or was sterile. In cultures of *Funaria* derived from secondary protonemata, after the appearance of the first antheridia, the tip, including the large assimilating leaves, was removed from each gametophore. The decapitated axes produced numerous lateral branches, which bore antheridia. No archegonial or mixed heads appeared. Uninjured gametophores in a portion of the same culture produced lateral female branches in the ordinary way. Similar results were obtained with plants grown from spores. Gametophores deprived of all their leaves, as well as decapitated, produced lateral branches that bore only antheridia. Gametophores grown in subdued light or under red glass produced antheridia at their tips but no lateral branches and hence no archegonia. These experimental results are held to confirm the idea already stated as to the necessity of abundant nutrition for the development of archegonia.—*C. E. Allen.*

3882. SCHIEMANN, ELIZABETH. **Die Phylogenie der Getreide. [The phylogeny of cereal plants.]** Naturwissenschaften **10**: 133–140. 1922.—The author points out the results of the various methods of approach (historical, plant geographical, descriptive, morphological, serological, hybridization, and cytological) to the question of the phylogeny of oats, wheat, rye, and barley. The author considers the derivation of oats and wheat as well worked out, while for barley little or nothing is known. Rye as an allogamic form is not considered in much detail.—*Orton L. Clark.*

3883. SCHOFIELD, RICHARD. **Inheritance of webbed toes.** Jour. Heredity **12**: 400–401. 1921.—A family history is described in which an asymmetrical webbed condition of certain of the toes has been transmitted from the original male ancestor to every male in the direct male line for 3 additional generations. No females have been affected or have transmitted the trait to their sons.—*Sewall Wright.*

3884. SPINKS, G. T. **Fruit breeding investigations.** Jour. Bath and West and Southern Counties Soc. **15**: 138–143. 1921.—A progress report is presented on the breeding of apples, pears, plums, cherries, currants, gooseberries, raspberries, strawberries, and tomatoes.—*J. L. Lauritzen.*

3885. STIEVE, H. [German rev. of: ENTRES, J. **Zur Klinik und Vererbung der Huntingtonschen Chorea. Nr. 3 der Studien über Vererbung und Entstehung geistiger Störungen von E. Rüdin. (Description and heredity of Huntington's chorea. No. 3 of studies on inheritance and origin of mental diseases by E. Rüdin.)** *149 p., 2 pl., 1 fig., 18 charts.* Julius Springer: Berlin, 1920.] Arch. Entwicklungsmech. **50**: 642–643. 1922.

3886. STIEVE, H. [German rev. of: HAECKER, V. **Die Erblichkeit im Mannesstamm und der vaterrechtliche Familienbegriff. (Inheritance in the male line and the concept of the family.)** *32 p.* Jena, 1917.] Arch. Entwicklungsmech. **50**: 637. 1922.

3887. STIEVE, H. [German rev. of: HOFFMANN, H. **Die Nachkommenschaft bei endogenen Psychosen. Genealogischcharakterologische Untersuchungen. (Studien über Vererbung und Entstehung geistiger Störungen von E. Rüdin.) (The offspring in endogenous psychoses, Genealogical-characterological study. [Studies on the inheritance and origin of mental diseases by E. Rüdin.]** *233 p.* Julius Springer: Berlin, 1921.] Arch Entwicklungsmech. **50**: 636–637. 1922.

3888. STIEVE, H. [German rev. of: KLATT, BERTHOLD. **Studien zum domestikationsproblem. Untersuchungen am Hirn. (Studies on the problems of domestication. Investigations on the brain.)** *184 p., 2 pl., 33 fig.* Gebrüder Borntraeger: Berlin, 1921.] Arch. Entwicklungsmech. **50**: 632–634. 1922.

3889. Stieve, H. [German rev. of: Schaxel, J. **Grundzüge der Theorienbildung in der Biologie. (Principles of theory formation in biology.)** *221 p.* G. Fischer: Jena, 1919.] Arch. Entwicklungsmech. **50:** 629–630. 1922.

3890. Stieve, H. [German rev. of: Schaxel, J. **Über die Darstellung allgemeiner Biologie. (On the presentation of general biology.)** Abhandl. Theoret. Biol. *62 p.* 1919.] Arch. Entwicklungsmech. **50:** 630–631. 1922.

3891. Stieve, H. [German rev. of: Schmidt, Johannes. **Der Zeugungswert des Individuums beurteilt nach dem Verfahren kreuzweiser Paarung. (Individual potency based on experiences in cross-matings.)** *40 p.* Gustav Fischer: Jena, 1919.] Arch. Entwicklungsmech. **50:** 637–638. 1922.

3892. Stieve, H. [German rev. of: Weil, A. **Die innere Sekretion. Eine Einführung für Studierende und Ärzte. (The internal secretion. An introduction for students and physicians.)** *140 p., 35 fig.* Julius Springer: Berlin, 1921.] Arch. Entwicklungsmech. **50:** 643–644. 1922.

3893. Strong, W. J. **Greenhouse cucumber breeding.** Proc. Amer. Soc. Hort. Sci. **18:** 271–273. 1921 [1922].—A new cucumber variety for forcing purposes has been developed at the Horticultural Experiment Station, Vineland, Ontario. The fruit is 8–10 inches long, 2 inches in diameter, and dark green in color. It sets fruit quite freely without artificial pollination, is prolific, and of good texture and flavor. To produce this variety Sutton's Everyday was crossed with Fisk's White Spine and this hybrid crossed with Princess.—*H. A. Jones.*

3894. Trouard-Riolle, Y. **Les hybrides de Raphanus. [The hybrids of Raphanus.]** Rev. Gén. Bot. 32: 438–447. 1920.—F_1 generations from direct and reciprocal crosses of *Raphanus Raphanistrum* and *R. sativus* were in all cases more vigorous than the parents and very much more so than the progeny of selfed seeds from the same plants. *R. Raphanistrum* used in these experiments had yellow flowers and *R. sativus* in the majority of cases had white flowers, sometimes with a slight tinge of rose or violet. All F_1 generation crosses had white flowers. One F_1 plant had a branch with white flowers and another yellow ones. Frequently flowers were found, especially among the last ones on the hybrid plants, which were partly yellow and partly white. The conclusion was reached from this evidence that it is possible to obtain dissociation of characters in the F_1 generation and furthermore that dominance and recessiveness are not absolute.—The structure of siliques on F_1 plants was intermediate. It was found, however, that the siliques developed from exceptional flowers were like those of *R. Raphanistrum.* Some observations were made on the inheritance of root color.—It is concluded that Mendel's laws only approach mathematical laws.—*M. Demerec.*

3895. Unite, Juan O. **Comparative tests of rice seeds from the principal and poorest culms in individual plants.** Philippine Agric. **10:** 243–251. 1921.—Plants from seed of the principal, or longest, culm and the poorest culm of individual rice plants were found in 2 generations to have equal yield values.—*Sam F. Trelease.*

3896. Vibar, Toribio. **Variation and correlation of characters among rice varieties with special reference to breeding.** Philippine Agric. **10:** 93–104. 1921.—Eighty-five varieties of rice were used in a study of variation and correlation, a random sample of 100 plants of each variety being taken for measurement. It was found that (1) late maturing varieties gave high grain yields; (2) tall varieties gave high grain yields; (3) varieties having long leaves, long panicles, or long grains gave high yields; (4) the width of broadest leaves, the width of grain, and the number of spikes in the panicle had no relation to yield and to period required for maturing; (5) the number of nodes in the panicle was highly correlated with yield, but not with period for maturing; (6) high straw yield was not correlated with high grain yield, but was correlated with late maturing.—*Sam F. Trelease.*

3897. VINALL, H. N., and A. B. CRON. Improvement of sorghums by hybridization. Jour. Heredity 12: 435–443. *1 pl., 6 fig.* 1921.—Seventeen artificial crosses have been made between sorghum varieties. Crosses between Feterita and Kafir, combining characteristics of both varieties, show remarkable uniformity after the 3rd generation although widely diverse types appeared in the F_2. The inheritance of seed color in a hybrid between Feterita and Red Amber Sorgo indicated a 2-factor difference. The authors assign the factorial symbols *r r b b* to Feterita and *R R B B* to Red Amber. Crosses between Feterita and Kafir also showed a 2-factor difference in seed color but in this cross a color-spreading factor is involved, designated *S S s s*. Feterita, then, has the factorial composition *SSbbrr;* and Kafir, *ssBBrr.* —*J. H. Kempton.*

HORTICULTURE

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(See also in this issue Entries 3276, 3304, 3352, 3418, 3434, 3452, 3519, 3594, 3614, 3650, 3751, 3758, 3796, 3804, 3809, 3815, 3856, 3868, 3873, 3884, 3893, 4194, 4207, 4315, 4342, 4450, 4474, 4479, 4505, 4507, 4526, 4529, 4531, 4536, 4545, 4550, 4551, 4562, 4587, 4662, 4666, 4667, 4688, 4689, 4701, 4702, 4773, 4784, 4848, 4859, 4892)

FRUITS AND GENERAL HORTICULTURE

3898. ANONYMOUS. **Cultivo del cacao. [Cultivation of the cacao.]** Rev. Agric. Com. y Trab. [Cuba] 5^1: 5. 1922.

3899. ANONYMOUS. **El cocotero. [The coconut tree.]** Rev. Agric. Com. y Trab. [Cuba] 5^1: 8. *2 pl.* 1922.

3900. ANONYMOUS. **Förderung der Rebenzüchtung durch die D. L. G. [Promotion of vine culture by the Deutsche Landwirtschaftliche Gesellschaft.]** Mitteil. Deutsch. Landw. Ges. **37**: 42–44. 1922.

3901. ANONYMOUS. **Pecan culture in California.** Amer. Nut Jour. **16**: 49. 1922.—The pecan industry is in its infancy, but new plantings are being made in some localities.—*E. L. Overholser.*

3902. ANONYMOUS. **Pecans in California.** Amer. Nut Jour. **15**: 20. 1921.

3903. ANONYMOUS. **Plant black walnuts from Mount Vernon along highways.** Amer. Nut Jour. **15**: 78. 1921.

3904. ANONYMOUS. **The Australian fruit growers' annual and trade record. [Rev. of: The Australian fruit growers' annual and trade record. Melbourne.]** Agric. Gaz. New South Wales **33**: 200. 1922.

3905. ANONYMOUS. **The Michigan planting bill.** Amer. Nut Journal. **15**: 79. 1921.

3906. ANONYMOUS. **The pecan industry in southwest Georgia.** Amer. Nut Jour. **14**: 47. 1921. The industry is in its infancy but is no longer an experiment; more trees are coming into bearing every year.—*E. L. Overholser.*

3907. ANONYMOUS. **The pecan industry—some facts and figures based upon actual experience.** Amer. Nut Jour. **14**: 52. 1922.—At Albany, Alabama, an organization known as the Paper Shell Pecan Growers' Association is operating. The 1921 crop, the bulk selling for 55 cents per pound, paid dividends on the older groves of approximately $100 per acre.—*E. L. Overholser.*

3908. Anonymous. **The pruner and the tree.** Associated Grower 3^1: 7. 1922.

3909. Anonymous. **To supply the sweet tooth of a nut-eating nation.** Amer. Nut Jour. 16: 44–45. 1922.—The Pinon nut has recently gained a recognized place among commercial nuts. It is a product of the 2-needled scrub pine of the arid southwest [U. S. A.] which attains a height of not more than 16 feet. In 1921 about 2,000,000 pounds were gathered in New Mexico alone.—*E. L. Overholser.*

3910. Anonymous. **Valor alimenticio del banano. [The food value of the banana.]** Rev. Agric. Com. y Trab. [Cuba] 5^2: 16. 1922.

3911. Ackerman, A. J. **Arsenical spray residue on harvesting fruit in relation to the control of codling moth on pears.** Monthly Bull. California Dept. Agric. 11: 12–17. 1922.

3912. Allen, F. W. **Picking for flavor and keeping quality.** Better Fruit 16^3: 8, 20; 16^4: 8. 1921.—Fruit picked before it has developed its normal size and color will be at the expense of quality. The most reliable single indicator of maturity is the "ground color" of the fruit. Apples should have turned slightly yellow at the time of picking. With red fruit this factor is of little value. A relatively cool atmosphere is conducive to the development of high flavor. Time of picking for flavor does not always coincide with time of harvesting for keeping quality. There is a close correlation between time of picking and the development of physiological decay in storage. Experimental data are given on the development of Jonathan spot and scald on fruit picked early and late in the season. The proper time for harvesting most varieties of apples is comparatively short.—*A. E. Murneek.*

3913. Allen, W. J., and J. M. Arthur. **Orchard experiments. Trials with stocks at Yanco experiment farm.** Agric. Gaz. New South Wales 33: 347–348. 1922.—Growth descriptions are given of different prune varieties budded upon different stocks.—*L. R. Waldron.*

3914. Allen, W. J., and W. W. Cooke. **Some notes on the packing of long types of apples.** Agric. Gaz. New South Wales 33: 287–293. *10 fig.* 1922.—Long types of apples, such as Adam's Pearmain and Delicious, when packed on the "flat," are commonly uneven in depth of tiers in the packing case. The "edge" pack with the long type of apples overcomes this difficulty in considerable measure. A still further improvement is here described in that the rows of apples are placed diagonally in rows in the case. The new method is described and illustrated from photographs.—*L. R. Waldron.*

3915. Arens, P. **Een voor Hevea schadelijke oeret (Holotrichia leucopthalma Wied.). [A white grub, Holotrichia leucopthalmia, injurious to Hevea.]** Arch. Rubbercult. 3: 437–449. 1919.—This grub was found attacking *Hevea* trees in Java. Thorough cleaning of all stumps, leaves, and branches from new clearings is advised as a preventive measure. In case of an attack, weeds should be allowed to grow as the larvae feed on the weeds and spare the *Hevea.*—*Carl D. La Rue.*

3916. Armstrong, M. D. **Applying the spray for anthracnose.** Better Fruit 16^3: 14–15. 1921.—Specific directions are given for slaking lime on a large scale to be used for preparation of Bordeaux spray.—*A. E. Murneek.*

3917. Barker, B. T. P. **Root development in newly planted trees.** Jour. Bath and West and Southern Counties Soc. 15: 175–194. *3 pl.* 1921.—This is a progress report. The following conclusions are drawn: (1) good aeration is essential to good root formation; (2) there is some variation in the root stock as to the origin and development of new roots.—*J. I. Lauritzen.*

3918. Barker, B. T. P., and A. H. Lees. **Factors governing fruit-bud formation. IV. Pruning.** Jour. Bath and West and Southern Counties Soc. **15**: 151–157. 1921.—A detailed account of the application of the Lorette system of pruning to English conditions is given.—*J. I. Lauritzen.*

3919. Barnard, L. C. **Experiments show value of wire bracing for fruit trees.** Associated Grower 3^3: 13, 33. 1922.—Wires are attached to the main limbs and drawn together toward the center of the tree and attacked to 1 ring. Screw eyes or staples are placed in the limbs to which wires are fastened. This method of supporting the trees not only saves time each year but is much more economical than wood prop supports.—*E. L. Overholser.*

3920. Batchelor, L. D. **Economic losses due to non-productive seedling walnut trees.** Monthly Bull. California Dept. Agric. **10**: 323–327. *2 fig.* 1921.—In seedling walnut orchards maximum profits can be realized only if the unproductive trees are removed. The proportion of unprofitable trees may be reduced by 3 methods: (a) removing the light-bearing trees and giving others more room to develop when the trees were originally spaced too close; (b) removing the shy bearing trees and substituting budded trees when shy bearing is not due to some localized soil condition; (c) top-grafting the light bearing trees, if vigorous and healthy, with a prolific variety. Older trees when over-crowded bear nuts only in the top. Vigorous seedling trees will succeed as well as black walnuts when top-grafted.—*E. L. Overholser.*

3921. Baxter, S. N. **Do not let the curbsetter ruin your trees.** Amer. Forest. **28**: 232–234. *5 fig.* 1922.

3922. Bergman, H. F. **Observations on the effect of water-raking on the keeping quality of cranberries.** Amer. Jour. Bot. **9**: 245–252. 1922.—The "water-raking" of cranberries as practised in Wisconsin was found to injure the keeping quality because of a greater prevalence of fungus rots and of smothering. Injury from the latter cause is apt to occur in Wisconsin marshes on account of the low oxygen content of the flooding water. Mature, fully colored berries suffer less than green or early-picked ones. To avoid fungus infection, quick and thorough drying of water-raked berries is essential. Differences were observed in the keeping qualities of different varieties of berries. Precautions to be observed in water-raking are mentioned.—*E. W. Sinnott.*

3923. Biederman, C. R. **Transplanting walnut trees.** Amer. Nut Jour. **16**: 59. 1922.

3924. Bioletti, Frederic T. **Possible crops of raisins.** Associated Grower 2^9: 17, 33. 1921.

3925. Bioletti, Frederic T. **Propagation of vines.** Associated Grower 2^2: 18. 1921.

3926. Bitting, K. G. **The olive.** *51 p., 5 fig.* Glass Container Association of America: Chicago. 1920.—This pamphlet gives an historical account of the olive. Descriptions of grades and methods of treatment preparatory to making the fruit ready for consumption are also given.—*C. G. Vinson.*

3927. Bixby, Willard G. **Reducing nut culture to a practical basis.** Amer. Nut Jour. **15**: 11. 1921.

3928. Bixby, Willard G. **The Zorn hickory nut, largest on record.** Amer. Nut Jour. **14**: 16. *1 fig.* 1921.—The indications are that this nut, found growing in Texas, is a hybrid between the mockernut (*Carya alba* Koch) and Arkansas hickory (*Carya Buckleyi Arkansana*); it resembles both varieties. The Zorn hickory nut is twice the size of those of either parent.—*E. L. Overholser.*

3929. Bixby, Willard G. **The question of propagated vs. seedling nut trees.** Amer. Nut Jour. **15:** 32–33. 1921.

3930. Bixby, Willard G. **The Stabler black walnut. A peculiar characteristic.** Amer. Nut Jour. **14:** 34–35. 1921.—The tree grows unusually large, the leaves tend to be specially numerous near the terminals of the branches, and the nuts are variable,—more so than any of the other varieties of black walnut.—*E. L. Overholser.*

3931. Bixby, Willard G. **Thin-shell hickories.** Amer. Nut Jour. **14:** 47. 1921.—Varieties of hickory thin enough to be crushed with the hand are the following: Vest, Laney, Swain, and Beaver. Little is known of the production records of these varieties.—*E. L. Overholser.*

3932. Bixby, Willard G. **What nut trees may be planted in the northern U. S.** Amer. Nut Jour. **16:** 4–5. 1922.—Pecans should not be planted north of the 41st parallel, but black walnuts, chestnuts, and hickories will grow farther north.—*E. L. Overholser.*

3933. Blake, M. A. **Effect of an early application of nitrogen on peach trees deficient in vigor.** Proc. Amer. Soc. Hort. Sci. **18:** 139–141. 1921 [1922].—Early application of sodium nitrate to a peach orchard low in vigor decidedly increased yield of fruit, size of fruit, set of fruit, amount of foliage, and growth. The darker green color of nitrated trees was very marked.—*A. Lee Schrader.*

3934. Blake, M. A. **Some results of pruning investigations with peaches.** Proc. Amer. Soc. Hort. Sci. **18:** 213–222. 1921 [1922].—A marked decrease in yield resulted when 70 per cent of the annual growth was removed at the end of the 2nd season. The yield was but slightly decreased by a pruning which removed 35 per cent of the annual growth. Therefore, peach trees that bear in the 3rd season should not be pruned too heavily. The size of the fruit varied inversely with the number of fruits borne on the tree.—*A. Lee Schrader.*

3935. Blokzeiyl, K. R. F. **Spice trade of Dutch East Indies.** Pharm. Era **55:** 207–208, 218. 1922.—This article gives an account of the cultivation and marketing of black and white pepper in Java and adjacent islands. A number of tables are given to show the exports and principal destinations from 1911 to 1920.—*C. M. Sterling.*

3936. Bobilioff, W. **Onderzoekingen over de vorming van latex bij Hevea brasiliensis. [Investigations on the formation of latex in Hevea brasiliensis.]** Arch. Rubbercult. **3:** 374–404. 1919.—This investigation proves that more latex can be drawn from bark in tapping than the bark originally contains, and therefore that new latex is formed in the bark. The types of globules in the latex were studied and it was found that different trees and different parts of a given tree contain different types. When latex is continually taken from small areas of bark, isolated by cutting away all connecting bark, certain types of globules disappear. If this bark is left untapped for some time these missing types of globules reappear. The author interprets this as indicating that new latex has been formed in the bark.—*Carl D. La Rue.*

3937. Boland, E. M. **Getting the people acquainted with the great American fig.** Associated Grower 2^6: 27. 1921.

3938. Boyer, J. **A seaside vineyard.** Sci. Amer. **126:** 107. *3 fig.* 1922.

3939. Brown, W. S. **Merits of the black raspberry.** Better Fruit 16^{11}: 10. 1922.—Brief suggestions are given for the growing of black raspberries.—*A. E. Murneek.*

3940. Brown, W. S. **Treatment of winter injured trees.** Better Fruit 16^8: 10, 19–20. 1922.—Where winter-injured trees may be saved, bridge grafting is suggested as of great value;

the usual procedure is given. Bordeaux paste is recommended as a good disinfectant for all wounds.—*A. E. Murneek.*

3941. BROWNING, W. BARKER. **Fertilizer trials in peach and fig orchards.** Associated Grower 3^2: 14. 1922.

3942. BULLARD, W. P. **Necessity and value of cooperating in marketing pecans.** Amer. Nut Jour. 14: 60. 1921.

3943. BURKE, E. **Need of commercial fertilizers in Bitter Root Valley.** [Montana.] Better Fruit 16^5: 18–20. 1921.—Nitrogen is the fertilizer most frequently needed in orchards of this valley. It can be supplied by growing and plowing under leguminous crops. In case of bearing fruit trees the use of a readily available nitrogenous fertilizer during the growth of the 1st and 2nd crops of legumes is recommended. Barnyard manure is also a good source of nitrogen for the orchard. In a few localities of the Bitter Root Valley the soil may be improved by applications of lime, the amount to be determined by the degree of acidity of the soil. Where phosphorus is deficient it should be supplied as ground phosphate rock for young trees and as superphosphate at the rate of 400–800 pounds per acre for bearing trees.—*A. E. Murneek.*

3944. BURKETT, J. H. **Seedling pecans vs. named varieties.** Amer. Nut Jour. 16: 33. 1922.—Sixty per cent of the commercial seedling pecans are produced in Texas, which normally produces an annual crop of 450–500 cars. The annual yield of seedling pecans is a determining factor in regulating the prices for other nuts.—*E. L. Overholser.*

3945. BURKETT, J. H. **How to plant a pecan tree that will live.** Amer. Nut Jour. 16: 37. 1922.—The following points should be observed: (1) only matured healthy trees free from mechanical injury should be used; (2) holes should be 2–3 feet in diameter and 3 feet deep; (3) the holes should be filled with water and allowed to become dry; (4) in placing trees in position top soil should be used around roots; and (5) after soil is placed in the hole water should be poured around the tree, and when this has soaked into the soil a cover of dry soil should be added to conserve the moisture.—*E. L. Overholser.*

3946. CALVINO, MARIO. **Frontispicio.** [Frontispiece.] Rev. Agric. Com. y Trab. [Cuba] 5^2: 23–24. 1922.—This is a description of *Ceiba Casearia* Medic. (*C. pentandra* Gaertn., *C. anfractuosa* Maza, *Eriodendron anfractuosum* DC., *Xylon pentandrum* O. Kuntze) of the family Bombaceae, which is the subject of the frontispiece. Epiphytes on the species are of the Bromeliaceae (*Tillandsia fasciculata* Sw. largely) and of the Cactaceae (*Rhipsalis Cassytha* Gaertn). *Ceiba Schottii* is grown in Mexico for the fibre on the fruit capsule known to commerce as "Kapok." This fibre is used in making life preservers, mattresses and pillows, and as a substitute for cotton in surgery. The fruit is edible, the seeds serve as stock food and yield an oil similar to cotton seed oil which is used as food and for making soap. The wood is soft and from it shoes and boats are made. The Mayan Indians of Yucatan and the Cuban natives hold the tree in reverence, attributing to it supernatural qualities. Medicinal qualities are claimed for certain of the plant parts.—*G. R. Hoerner.*

3947. CHAPMAN, C. C. **Old citrus orchard decline.** Monthly Bull. California Dept. Agric. 10: 528–530. 1921.

3948. CHASSET, L. **La cueillette trop hâtive des fruits.** [Premature harvesting of fruits.] Rev. Hort. 93: 376–377. 1921.—Suggestions on the time of picking several varieties of pears are given.—*E. J. Kraus.*

3949. CHASSET, L. **La sélection des greffons.** [The selection of scions.] Rev. Hort. 93: 408–409. 1921.—Increased hardiness and productivity have been secured in several varieties of pears through selection of scions from trees possessing these traits.—*E. J. Kraus.*

3950. Chien, Tien Ho. **[A list of Chinese horticultural plant names.]** Ko-Hsueh [Science-Publication of the Chinese Science Society] **6**: 1267–1280. 1921.—A large number of common horticultural plants in China is listed with the Chinese names in characters, common English names, Latin botanical names, and the place of origin in Chinese.—*Chunjen C. Chen.*

3951. Close, C. P. **Report of committee on new fruits.** Proc. Amer. Pomol. Soc. **1920**: 127–178. 1921.—An effort is made to include the name and brief description of all varieties which are new or little known. With peaches, for instance, the names listed do not appear in Hedrick's Peaches of New York, thus supplementing Hedrick's work and making the list of peach names more complete. With apples an effort has been made to include all not in Ragan's Nomenclature of the Apple, and Beach's Apples of New York, and thus complete a record of all the varieties ever introduced into the U. S. A. The list of cherries supplements Hedrick's Cherries of New York. All the strawberries are listed except those appearing in the Virginia Agricultural Experiment Station Technical Bulletin No. 11 and North American Varieties of the Strawberry, by S. W. Fletcher The list of bush fruits includes those not in Card's Bush Fruits. The pear list supplements Ragan's Nomenclature of the Pear. The other lists contain as many new varieties as could be located except that with grapes a great many European varieties introduced into California are not included because the information could not be assembled.—*W. E. Whitehouse.*

3952. Colby, A. S. **Strawberry club manual.** Illinois Agric. Exp. Sta. Circ. 254. *12 p., 4 fig.* 1922.—The proper methods for starting and managing strawberry beds are discussed and suggestions for insect and disease control are given.—*O. H. Sears.*

3953. Condit, I. J. **California fig varieties.** Monthly Bull. California Dept. Agric. **10**: 359–366. *Fig. 70–71.* 1921.—The 4 leading varieties of figs grown in California in the order of their commercial importance are Adriatic, Calimyrna, Mission, and Kadota. The largest plantings are being made to the Calimyrna, though heavy plantings of Kadota are made. The Calimyrna is the best fig for drying and for fresh shipment, but requires caprification. The Mission is the heaviest and most regularly bearing variety, but is not accepted by the trade because of its color. There is need of a white fig with the good qualities of the Mission.—*E. L. Overholser.*

3954. Condit, I. J. **Figs, facts and figures.** Associated Grower **3**^{5}: 9, 12. 1922.—The detrimental effects of the spring frost of 1921 are beginning to show. Throughout the San Joaquin and Sacramento valleys are fig trees with many dead branches and terminals; these should be carefully pruned out. The Sykes fig pack is being improved, and it is expected that heavier shipments of green figs will be made. The State Nurserymens' Bud Selection Association is planning a campaign to place permanent labels on all caprifigs in the valley.—*E. L. Overholser.*

3955. Condit, I. J. **Frost injury to young fig trees.** Associated Grower **2**^{5}: 20, 41. 1921.—In California on the night of April 3, 1921, a frost did considerable damage to figs. Young shoots of the Calimyrna were killed completely and in some cases the tips of the old growth were injured. Adriatic, which was further advanced, was damaged very little. After 10 days caprifigs showed indications of damage. In the foothills little damage was done, due to the good air drainage. This frosted growth should not be pruned out too early.—*E. L. Overholser.*

3956. Condit, I. J. **Getting the people acquainted with the great American fig.** Associated Grower **2**^{4}: 13, 20, 28; **2**^{5}: 26–27. 1921.—The 4 important commercial varieties of figs grown in California are: Adriatic, Calimyrna, Mission, and Kadota. The following varieties are grown commercially on a limited scale: Brown Turkey, Black Spanish, Brunswick, Celaste, Cordelia, Douro, Gentile, Lipari, Panachee, Pastelliere, San Pedro Black, San Pedro White, and Verdal Long. While these varieties are grown, they are not yet considered of great commercial importance.—*E. L. Overholser.*

3957. Condit, I. J. **Handling caprifigs.** Associated Grower 3^4: 11, 26–27. 1921.—Growing Calimyrna figs is a specialized industry requiring close attention. The Mamme or "carry-over" figs, which set in November, are sometimes damaged by cold, or so injured that the *Blastophaga* larvae or pupae are killed. Some varieties differ in their ability to carry over the Mamme crop. A good method to colonize caprifig trees is to pick some of the mature figs from old trees and place them in the young trees. Some success has been secured by picking and storing Mamme figs. The maturity of the fig can be determined by change of color and softening of texture.—*E. L. Overholser.*

3958. Condit, I. J. **Planting fig trees.** Associated Grower 3^3: 28–29. 1922.—Figs are universally propagated by cuttings, the cuttings sometimes being made from both 1- and 2-year-old wood. Cuttings should be taken from trees true to type, and never from young trees of which there is no record as to yields and trueness to type. The trees are planted at the age of 1 and 2 years. The planting distances vary from 20 to 50 feet. Planting should be done anytime during the dormant season; in very heavy soil it is preferable to plant in late winter. Special precautions should be taken not to injure the young trees during transplanting.—*E. L. Overholser.*

3959. Condit, I. J. **Shipping fresh figs.** Associated Grower 2^6: 7, 43. *Fig. 1.* 1921.—Commercially, the shipping of fresh figs to eastern markets is in its infancy. Several packs have been tried out, and investigations of 1920 proved that the so-called "Sykes" pack promises to be successful. Some growers are using on a small scale the "Pony" refrigerator, which carries 32 baskets of figs each weighing 8 pounds; this method is expensive.—*E. L. Overholser.*

3960. Condit, I. J. **The California fig—its status in the markets, its rivals.** Associated Grower 2^7: 26–27. 1921.—The fig tree has been growing in California for over 150 years. The following increase in production of dried figs is noted: 1883, 30 tons; 1888, 37½ tons; 1895, 770 tons; 1900, 2000 tons; 1910, 3775 tons; 1915, 850 tons; 1920, 10,000 tons. The total acreage of bearing and non-bearing figs in California in 1920 has been estimated at 36,500 acres. An importation of figs equal to the present production in California is received from countries bordering the Mediterranean Sea.—*E. L. Overholser.*

3961. Condit, I. J. **Top-working fig trees.** Associated Grower 3^2: 43. 1922.

3962. Crow, J. W., and C. C. Eidt. **The relation of certain orchard practices to fruit-bud formation.** Proc. Amer. Soc. Hort. Sci. 18: 104–108. 1921. [1922].—These investigators report that biennial bearing of apples can easily be changed to annual bearing by governing spur growth and hence fruit-bud formation. This regulation of spur formation has been accomplished in 2 ways: "First, by an application of sodium nitrate early in the off year; second, by a moderate heading back of small branches throughout the head of the tree, likewise in the off year." Any treatment to control spur growth must be effective during the short growing season of the spur, which is completed before the petals begin to drop. The authors also report that normal fruit-bud formation is controlled entirely by pre-blossom conditions.—*A. Lee Schrader.*

3963. Dahl, Arthur L. **The English walnut industry in California.** Amer. Nut Jour. 16: 4–5. 1922.—California has 65,000 acres of English walnuts, representing an investment of $60,000,000. The average crop is about 40,000,000 pounds, selling for about $10,000,000. The crop is packed and sold through the Walnut Growers' Cooperative Association, which consists of 25 local packing associations.—*E. L. Overholser.*

3964. Davis, G. E. **Approved culture of red raspberries.** Better Fruit 16^9: 10–11. 1922.—This is a popular discussion of growing red raspberries in the coastal sections of the Pacific Northwest.—*A. E. Murneek.*

3965. Diehl, H. C., and J. R. Magness. **The ripening of California plums.** Monthly Bull. California Dept. Agric. **11**: 387–392. 1922.—Experiments were conducted on the ripening of Wickson plums, a Japanese variety, and of the Grand Duke, of European origin. In both, pickings were made over a period of about 6 weeks to determine the best picking date to secure high sugar content and other desirable qualities. These experiments proved that if the growers throughout the state picked about 1 week later plums of better color and of much higher eating quality would be obtained.—*E. L. Overholser.*

3966. Dobbs, C. M. **Precocity in orange seedlings.** Jour. East Africa and Uganda Nat. Hist. Soc. **5**^{14}: 415. 1919.—This is a note on the formation of flowers and young fruit on seedlings 2–3 inches in height.—*Wm. Randolph Taylor.*

3967. Esser, F. **Obstbau an der Landstrasse. [Fruit growing along roadsides.]** Gartenwelt **24**: 53–54. 1920.—The following apple varieties are recommended: Winterstreifling, Rheinischen Bohn and Pommeranzen.—*J. C. Th. Uphof.*

3968. Farrand, T. A., and R. E. Marshall. **Extension work in fruit fertilization in Michigan.** Proc. Amer. Soc. Hort. Sci. **18**: 108–110. 1921 [1922].—A discussion is presented of fruit fertilization work as carried out under the supervision of a specialist employed jointly by the Experiment Station and the Extension Department. Apples, cherries, grapes, pears, peaches, plums, strawberries, raspberries, and blackberries were used, the work being performed throughout the commercial fruit producing sections of Michigan. Nitrogen was the only element giving contrasting results when used singly with several fruits. Phosphorus, as a supplement to nitrogen, has usually given better results than nitrogen alone. A complete fertilizer produced best results in several tests, but these were not consistent enough to warrant a recommendation of potash as a supplement to nitrogen, or to nitrogen and phosphorus.—*W. E. Whitehouse.*

3969. Fichter, G. **Ein Kapitel zur Anzucht von Obstunterlagen. [A chapter on breeding stock for fruit trees.]** Möllers Deutsch. Gärt. Zeitg. **36**: 185–186. 1921.

3970. Fisher, D. F. **Winter injury to fruit and nut trees.** Better Fruit **16**^{6}: 5–6, 18–19. 1921.—The following types of frost injury are listed and commented upon: killing of fruit buds, killing of tips of twigs, browning or blackening of branch or stem wood, cracking of bark of trunk, lifting of bark on the south and southwest sides of branches or trunk, girdling of tree near the ground line, and killing of roots. The conditions of the tree influencing its susceptibility to frost damage are outlined, in order of their importance, as follows: (1) degree of dormancy of the principal parts involved, (2) species of tree, (3) variety, (4) age, (5) cultural conditions; (a) character of soil, (b) moisture, (c) fertility, (d) cultivation and cover crops. In a perfectly dormant tree the different structural parts are killed in approximately the following order: (1) ring of wood next to pith, (2) pith, (3) layer of wood next to cambium, (4) woody cylinder, (5) "fleshy" part of bark, (6) cambium. Usually buds are as hardy as the woody cylinder of the tree. Examples are cited from observations made by the author on frost injured trees in the Pacific Northwest in 1920.—*A. E. Murneek.*

3971. Flipse, L. **The avocado from the investors' standpoint.** Proc. Florida State Hort. Soc. **1921**: 60–63. 1921.

3972. Gadeceau, E. **Floraison à Nantes de l'Arundinaria Hindsii. [The blooming of Arundinaria Hindsii, at Nantes.]** Rev. Hort. **93**: 367–368. *Fig. 94.* 1921.

3973. Gallarda, J. W. **Caring for young vines nipped by spring frost.** Associated Grower **3**^{1}: 15. 1922.

3974. Gilbert, E. **Das Treiben der Pfirsiche. [Forcing peaches.]** Gartenwelt **24**: 509–511. 1920.—Before flowering the soil is watered with moderately warm water, the walls of the greenhouse being sprayed with water. The temperature is at first kept at 10–12°C.; during the flowering period at 15–18°C. During flowering the house is kept dry, but the soil is watered once or twice daily. When young shoots are 4–6 cm. long, only those are removed which will be excessive the coming year. When the fruits are 2 cm. long they are thinned. During stone formation, watering is reduced, otherwise many fruits may drop. When fruits are swelling and coloring they may receive abundant water and liquid manure, and the temperature may be raised to 25°C. During ripening more air is given than usual and less water. Fruits are picked when half ripe and kept in cotton in a cool place; this is preferable as fruit ripened on the tree becomes mealy. The following varieties are recommended for forcing in greenhouses: Early Beatrice, Early York, Early Alexander, Early Hales; medium early, Bellgarde, Royal George, Sterling Castle, Diamond, Belle de Doue, Raymaker; late, Prince of Wales, Princess of Wales, Golden Eagle, Sea Eagle, Barrington, Late Admirable, and Walburton. Barrington, Sea Eagle, and Princess of Wales produce largest fruits and are best suited for marketing.—*J. C. Th. Uphof.*

3975. Goldberg, E. R. **Avocado culture in South Dade County.** Proc. Florida State Hort. Soc. **1921:** 81–85. 1921.—Development of groves is retarded by shortage of nursery stock. Avocado growing is promising. No land subject to overflow or to water standing more than two or three days should be used. The soil is of coralline origin and is intermingled with red clay. Trees are planted at not less than 25 × 25 feet. A profitable planting consists of trees which produce fruit in different months. West Indian and Guatemalan races are grown; the former is extensively planted and used as stock for the Guatemalan varieties. The following varieties are recommended: Pollock, Trapp, Waldin, Taft, Taylor, and Wagner.—*J. C. Th. Uphof.*

3976. Gravott, G. F. **The purchase of chestnut trees with reference to the blight.** Amer. Nut Jour. **14:** 53. 1921.—Great danger from spread of chestnut blight, caused by *Endothia parasitica*, exists in the purchase of trees from eastern nurseries. The need of quarantine laws in many of the western states is apparent in view of the rapidity with which the disease may be spread by nursery stock. Trees should be planted which have at no time grown within the blight area (from North Carolina north to Canada and westward into Ohio and West Virginia).—*E. L. Overholser.*

3977. Haack, E. H. **Organized growers extend strawberry markets.** Associated Grower 3^2: 26. 1922.—California has approximately 3400 acres of strawberries. The strawberry industry was not profitable until 1917, when the Central California Berry Growers' Association was organized. Since that time carload shipments are sent as far north as Seattle, and by pre-cooling and special care have been shipped to New York for Thanksgiving trade. The plants yield best the 2nd season and are usually not profitable after the 4th.—*E. L. Overholser.*

3978. Halbert, H. A. **Improved methods in propagating pecans.** Amer. Nut Jour. **16:** 59. 1922.—It is unnecessary to try to save dormant buds for spring or summer use in budding pecan trees since dormant buds can always be found on trees. In tying the buds, 2 strands of raffia or waxed cloth should be used, one above the bud and the other below. Usually the upper strand can be removed in 5–6 days; the lower should be cut after the bud gets well started. This method causes an accumulation of sap around the bud which induces rapid growth.—*E. L. Overholser.*

3979. Halbert, H. A. **Methods of scoring pecans.** Amer. Nut Jour. **16:** 10. 1922.—The only methods of scoring pecans are (1) from the producer's standpoint and (2) from that of the consumer. Prolificness represents the merits to the producer; and "per cent of kernel" or quality is the factor in which the consumer is interested.—*E. L. Overholser.*

3980. Halbert, H. A. **The pecan root system.** Amer. Nut Jour. **14:** 38. 1921.

3981. Harmeling, E. **Pear culture in western Washington.** Better Fruit 16[11]: 8, 19–20. 1922.—This is a popular article on establishing and maintaining a pear orchard in western Washington.—*A. E. Murneek.*

3982. Hartman, H. **The Red Rome, a promising apple.** Better Fruit 16[8]: 23–24. 1922. —The Red Rome, originating in Ohio, is suggested as a promising red apple for western Oregon.—*A. E. Murneek.*

3983. Heinicke, A. J. **Some relations between circumference and weight, and between root and top growth of young apple trees.** Proc. Amer. Soc. Hort. Sci. **18**: 222–226. 1921 [1922].—A curve plotted with average values showed that the weight of young apple trees increased approximately 7.3 times while the circumference doubled. However, wide variations in weight occurred between trees of the same circumference. Therefore, "circumference measurements are reliable as a measure of small differences only when rather large numbers of approximtely similar trees are concerned in the average." Circumference records are probably more reliable than average twig lengths as an index of growth from year to year. The depth of planting influenced the ratio of root to top by weight; the more deeply planted trees had a smaller root system in proportion to top although the total weight of tree was not influenced. Some cases did not follow this average behavior. A possible explanation for these exceptions may be found in the rate of growth, or the height and spread of tops. Trees grown in sod showed a heavier root system than trees under cultivation, although application of nitrate to the sod plots reversed this relationship.—*A. Lee Schrader.*

3984. Helten, W. M. van. **Eenige verdere proeven met het oculeeren van Hevea in den Cultuurtuin. [Further experiments in budding Hevea in the Botanic Garden.]** Arch. Rubbercult. **3**: Algemeen Gedeelte 1–6. 1919.—Three methods of budding were tried; patch-budding, the Forkert method, and the inverted T-cut method. The 1st gave the greatest increase in diameter and the 2nd the greatest growth in length. The age of the tree from which the buds are taken had little influence on the success of the budding. The greater the diameter of the branches from which buds are taken the greater are the chances of failure. Stocks older than 2 years can rarely be budded successfully. There appears to be a difference in the buds from different trees. Budding during the monsoons was found less satisfactory than at other times. In these experiments the use of grafting wax was found to have no beneficial influence.—*Carl D. La Rue.*

3985. Hendrickson, A. H. **Cover crops for deciduous orchards.** Monthly Bull. California Dept. Agric. **10**: 328–330. 1921.

3986. Heusser, C. **Over de selectie van Hevea brasiliensis Mull. Arg. [Selection of Hevea brasiliensis.]** Arch. Rubbercult. **3**: Algemeen Gedeelte 8–15. 1919.—Methods of producing high yielding races of *Hevea* by crossing and by vegetative reproduction are given. The desirability of importing new and superior stock from Brazil is emphasized.—*Carl D. La Rue.*

3987. Hobley, C. W. **Zizyphus jujube.** Jour. East Africa and Uganda Nat. Hist. Soc. 5[14]: 411–412. 1919.—The article gives a discussion of the distribution of this tree and of the uses of the fruits and seed.—*Wm. Randolph Taylor.*

3988. Hooker, H. D., Jr. **Horticulture as a science.** Science **55**: 384–388. 1922.

3989. Hooker, H. D., Jr. **The season of application of nitrogenous fertilizers as affecting the chemical composition of spurs and bark.** Proc. Amer. Soc. Hort. Sci. **18**: 150–152. 1921 [1922].—Chemical analyses of spurs collected at the end of June show lower starch content and higher nitrogen content in treated plots than in check plots; the application of quickly available nitrogen to these plots was made in March. Since fruit-bud differentiation in apples is associated with accumulation of starch in spurs late in June, "spring fertilization cannot, therefore, be expected to increase directly the percentage of fruit-bud differentiation." Chemical analyses of spurs in the spring following the treatment show that early-spring fertilized trees have no greater nitrogen content the following spring than the check trees. Later applications, however, result in an increased nitrogen content; the later the treatment the greater the nitrogen increase the following spring.—*A. Lee Schrader.*

3990. Howard, W. L. **Rootstock studies in Europe.** Proc. Amer. Soc. Hort. Sci. 18: 250–255. 1921 [1922].—This is a report of observations during 4 months study of rootstocks in France, Spain, and Italy. A study was first made of the origin of cherry stocks. Mahaleb seed is collected chiefly from the Rhone river valley in the vicinity of Lyons; the cherries occur in the hedges as fences for dividing fields. The seed are harvested by peasants and contracted for by exporters. There appeared to be great uniformity among the wild Mahaleb trees. Eighty times as many Mahaleb as Mazzard stocks are used annually in the U. S. A., but 90 per cent of the sweet cherries are grown on Mazzard roots. The Mazzard cherry is found chiefly in Normandy in the department of Calvados. Seldom occurring in pure stands, it is mixed with various native trees, some of which exceed it in height. The supply of wild Mazzard trees is wholly inadequate for filling the normal demand for seed. Only relatively few real Mazzard seed are collected, the bulk of the seed going into the trade coming from cultivated varieties and seedlings; the latter are apt to be a mixture of sweet and sour cherries. The author suggests that this may account for the differences in behavior of trees propagated upon them. The Myrobalan, or cherry plum, used generally as a plum and prune stock in the U. S. A., is extensively grown in fruit gardens in northeastern Italy. Seven distinct types of fruit were found by the author, seed from each of which were shipped to the University of California to be tested. The so-called French crab apple seed are collected from the orchards of northwestern France. Practically all the orchards of this district are seedlings, most of the fruit being converted into cider. During the past few years both apple and pear seeds have been coming from the vicinity of Steinmarkt, Austria.—Walnuts are universally propagated on Persian walnut seedlings, although 1 case was found in which the black walnut of the eastern U. S. A. (*Juglans nigra*) was used as a stock in an attempt to obtain one resistant to the oak fungus (*Armillaria mellea*), which is killing walnuts.—*W. E. Whitehouse.*

3991. Janson, A. **Beiträge zur Tragbarkeit von Obstpflanzungen. [Productivity of orchards.]** Gartenwelt 25: 214–216. 1922.—Results of a study of the yield of fruit trees on the estate Grödlitz near Lausitz are given. All trees (3000) were numbered and from 1917 the harvest of each was regularly recorded. Abundance of bloom is not correlated with a good harvest, as an unfavorable flowering season may be followed by a good harvest. Sweet cherry trees (440) produced on the average 13.33 pounds of fruit annually per tree, the yield ranging from 0 in 1917 to 27 in 1919. Two Gloria Mundi apple trees yielded an average of 58.7 pounds per tree annually over a period of 5 years.—*J. C. Th. Uphof.*

3992. Janson, A. **Obstpflanzungen an Landstrassen und offentliche Wegen. [Fruit trees along public roads.]** Gartenwelt 24: 235–239. 1920.—The production of fruit trees along roads is very low, averaging 80 pfennig per tree before the war. An account is given of drainage, fertilizing and planting of apple trees along roads. Telephone and telegraph wires often cause much damage.—*J. C. Th. Uphof.*

3993. Johnson, B. N. **Growing apples in Willamette Valley.** Better Fruit 16^{10}: 10–11, 22. 1922.—This is a popular discussion of experiences in managing a large apple orchard.—*A. E. Murneek.*

3994. Jones, J. F. **Grafted vs. seedling trees.** Amer. Nut Jour. 15: 14. 1921.

3995. Jones, J. F. **Selecting and handling scions.** Amer. Nut Jour. 14: 45. 1921.—It is important to select well matured wood to endure a maximum amount of exposure. Good scions are distinguished by solid, well matured growth and a thick, dark colored bark. The buds are also large and usually set close together. The scions may be kept several months or longer in sphagnum moss treated with $\frac{2}{3}$ strength Bordeaux, in cold storage.—*E. L. Overholser.*

3996. Karper, R. E. **Compound fruits in the peach resulting from multiple pistils.** Jour. Heredity **12:** 403–406. *1 pl., 2 fig.* 1921.—Double or 2-lobed peaches from compound pistils occur frequently, and even 3-lobed peaches have been observed, though the latter cases have many simple pistils,—the multiple fruits produced running as high as quintuples and occurring in large numbers. One tree which bore a light crop in 1918 produced 45 per cent of the fruit in multiples in 1919. The production of multiple fruits on trees which in some years fruit normally is ascribed to the resumption of fruiting after several years of dormancy resulting from unfavorable climatic conditions.—*J. H. Kempton.*

3997. Kelsey, J. J. **The Kelsey plan for northern nut culture.** Amer. Nut Jour. **14:** 19. 1921.—The author claims that the more healthy and quick-growing the tree the more easily the nuts are cracked.—*E. L. Overholser.*

3998. Kime, C. D. **Suggestions for increasing the consumption of citrus fruit.** Proc. Florida State Hort. Soc. **1921:** 129–136. 1921.

3999. Lewis, C. I. **The horticultural trend in the Northwest.** Proc. Amer. Pomol. Soc. **1920:** 123–124. 1921.—This is a general account of the increase in planting and advancement in methods of marketing, together with some of the growing problems and functional troubles encountered by growers. In the Northwest, particulary Oregon, prunes, loganberries, gooseberries, and strawberries are being planted very extensively. Single strawberry plantings of 600 acres have been made. The great diversity in planting has been partly brought about by a phenominal development in the horticultural products business. The war revolutionized spraying in Oregon; the tendency is to use 10–12 horsepower spraying machines, making the use of 2 large guns possible and thus economizing on labor.—*W. E. Whitehouse.*

4000. Long, C. L. **Soil fertility as related to orcharding.** Better Fruit **16**^{9}: 9, 26–27. 1922.—As a result of clean cultivation most orchard soils in the Pacific Northwest have become depleted in organic matter and deficient in fertility. The most serious loss is in nitrogen content. Judicious growing of cover crops, supplemented by commercial fertilizers—particularly nitrate of soda—or by manure, is suggested as the most feasible remedy.—*A. E. Murneek.*

4001. Lu, Fei Chih. **[Investigation of the citrus industry in Florida.]** Ko-Hsueh [Science—Publication of the Chinese Science Society] **5:** 1251–1262. 1920. [Text in Chinese.]—This article relates in general to the processes of picking, packing, transportation, and marketing of citrus fruits in Florida. The organization of the Florida Citrus Exchange is also described in detail.—*Chunjen C. Chen.*

4002. McClintock, J. A. **Top-grafting.** Amer. Nut Jour. **16:** 23. 1922.

4003. McKevitt, F. B. **The problem of old deciduous orchard decline.** Monthly Bull. California Dept. Agric. **10:** 516–519. 1921.

4004. Maney, T. J., and H. H. Plagge. **Factors which influence the production and growth of fruit buds on the apple.** Proc. Amer. Soc. Hort. Sci. **18:** 100–103. 1921 [1922].—This paper presents the growth conditions of an apple tree as a good index for interpreting the effects of various factors on the production of fruit. Some data are presented showing a correlation between the average terminal growth and the number of fruiting spurs on a tree. Sunlight is shown to be a limiting factor in production, terminal growth, and circumference growth. "The best nutritional practice is one which will encourage strong terminal growth, and thereby provide an abundant supply of fruit spurs."—*A. Lee Schrader.*

4005. Matthews, C. D. **Report of the division of horticulture.** Ann. Rept., North Carolina Agric. Exp. Sta. **42:** 59–65. 1921.—This is a report concerning experimentation with peaches, pecans, apples, strawberries, sweet potatoes, Irish potatoes, and cabbage.—*F. A. Wolf.*

4006. Memmler. **Der Obstbau in Turkei. [Fruit growing in Turkey.]** Gartenwelt **24:** 46–47. 1920.—Fruit growing in Turkey is very primitive and not as well developed as vegetable growing, depending much upon the water supply of the various regions. Trees are often planted too far apart. Varieties are of poor quality. Some Turkish varieties of quince, apple, pear, peach, cherry, and plum are given.—*J. C. Th. Uphof.*

4007. Michelson, Hamilton. **Shipping and marketing the avocado.** Proc. Florida State Hort. Soc. **1921:** 89–91. 1921.

4008. Morris, O. M. **Orchard cultivation and improvement.** Better Fruit **16^{11}:** 5–6, 22–23. 1922.—Orchard cultivation practices have changed rapidly during the past few years in the Pacific Northwest, resulting in general supplanting of clean cultivation by growing of cover crops. Most soils in this section have become deficient in nitrogen while others may be short in potash and phosphorus as well. The usual 7-plot method of testing the commercial fertilizer requirements of a particular soil is recommended. Emphasis is laid upon the value of cover crops—vetch, wheat, rye, field peas, crimson clover—for improving soil fertility.—*A. E. Murneek.*

4009. Morris, Robert T. **Nut tree grafting by an easy method.** Amer. Nut Jour. **14:** 57. 1921.—The method "immediate grafting" consists in inserting the scions immediately after cutting and is done during the growing season,—preferably not later than July. Skill is necessary and the scions and wounds must be completely covered with paraffine.—*E. L. Overholser.*

4010. Morris, Robert T. **Utilization of certain reparative processes in grafting work.** Amer. Nut Jour. **15:** 4–5. 1921.—It was observed that if an outline of the bud is cut into the stock 1 week previous to the insertion of the bud, granulation of callous proceeds, causing a most perfect union of the scion and stock of the walnut. The author is conducting tests to determine whether or not the treating of the scions with isotonic solutions has any effect on perfecting the union of grafts.—*E. L. Overholser.*

4011. Mottet, S. **Les vignes à fruits bleus. [Vines with blue fruits.]** Rev. Hort. **93:** 392–393. *1 pl.* (*colored*). 1921.—Description and notes are given on the culture of *Vitis heterophylla variegata* and of *V. brevipedunculata.*—*E. J. Kraus.*

4012. Nichols, P. F. **Sun-drying versus dehydration.—A preliminary report.** Monthly Bull. Dept. Agric. California **10:** 191–198. 1921.—Sun-drying is defined as drying by solar heat; dehydration as drying by artificial heat. From a preliminary study of the 2 methods the author concludes that dehydration offers a possibility of greater yield than sun-drying. Furthermore, the products are lighter in color and have more of the fresh appearance and flavor. The investment per green ton dried is greater for the dehydrator and the cost of drying raisins and prunes is greater by dehydration; but this may be offset by the higher prices commanded by the products.—*E. L. Overholser.*

4013. Niswander, J. F. **A review of peach and fig situation.** Associated Grower **2^{7}:** 9, 45. 1921.

4014. Nougaret, R. L. **A proposed treatment for frosted grapevines.** Monthly Bull. California Dept. Agric. **10:** 345–358. *Fig. 58–69.* 1921.—Observations made in the field on 11 varieties of grapes after the freeze of the spring of 1921 indicate that laterals produced by an injured primary bud shoot do not bear fruit. If the shoot is frozen completely back to the spur it will often induce a recuperative crop from other parts of the vine; if only partly killed it will put forth sterile laterals. The best procedure seems to be to break off the injured shoot back to the spur, as there is less bleeding than when either the shoot or the spur is cut clean to an uninjured bud; and in the case of the shoot, sterile laterals are not induced. —*E. L. Overholser.*

4015. Nougaret, R. L. **Report of the viticultural service.** Monthly Bull. California Dept. Agric. **10:** 627–642. 1921.

4016. Orb, G. A. **Thistle gardening in San Francisco.** Sci. Amer. **126:** 181. *1 fig.* 1922.—A description of an artichoke is given.—*Chas. H. Otis.*

4017. Overholser, E. L. **Good reasons for thinning peaches.** Associated Grower 2^4: 17, 36–37. 1921.

4018. Overholser, E. L. **Planting the peach orchard.** Associated Grower 2^4: 13, 28, 29. 1921.

4019. Overholser, E. L. **Varieties of peaches for commercial orchards.** Associated Grower 2^2: 11. 1921.

4020. Partridge, N. L. **A note on the fruiting habit of the Concord grape.** Proc. Amer. Soc. Hort. Sci. **18:** 193–196. 1921 [1922].—Records of yields from every shoot of 48 vines show that the yield of grapes from a cane followed a definite curve with low production from the basal nodes, rising to optimum production at the 6th node, and finally falling off rapidly to the distal end of the cane. Pruning to a cane of 8 or 9 buds would be more profitable than pruning to a spur.—*A. Lee Schrader.*

4021. Pearcy, Knight. **Commercial possibilities of the chestnut.** Better Fruit 16^4: 7–8. 1921.—This is a popular discussion of the commercial possibilities of growing chestnuts in Oregon. At present the chestnut is of minor importance as a horticultural product of the Pacific Northwest. Some varieties of Japanese (*Castanea crenata*) or Chinese (*C. molissima*) chestnuts, due to their comparative resistance to chestnut blight (due to *Endothia parasitica*) may have a future commercial value in this district.—*A. E. Murneek.*

4022. Pearcy, Knight. **Oregon walnuts and filberts.** Amer. Nut Jour. **15:** 47. 1921.—The acreage of nuts in Oregon is increasing, better care is taken of the orchards, and growers are organizing to promote the growing of a high-class product.—*E. L. Overholser.*

4023. Pearcy, Knight. **The filbert in the Northwest.** Amer. Nut Jour. **16:** 61. 1922.—No section of the U. S. A. is so well adapted to filberts as is the Northwest Heavy rains during blossoming and harvesting periods have no particular detrimental effect; also no serious injury is done by frost. In Oregon the filbert produces heavily and the fruit is of high quality.—*E. L. Overholser.*

4024. Poetz, J. **Betrachtungen über Unterlagen. [Considerations concerning stocks.]** Gartenwelt **24:** 90–92. 1921.

4025. Popenoe, Paul. **Date palms are profitable as well as ornamental.** Associated Grower 2^3: 38. 1921.

4026. Popenoe, Wilson. **Avocado explorations in tropical America.** Florida Grower **26:** 3–4. *2 fig.* 1922.

4027. Popenoe, Wilson. **The Andes berry.** Jour. Heredity **12:** 387–393. *Frontispiece and fig. 1–3.* 1921.—The Andes berry (*Rubus glaucus* Benth.) is one of the most valuable of the many species of *Rubus* scattered throughout the highlands of tropical America and is found both wild and cultivated in Guatemala, Costa Rica, Colombia, and Ecuador. In size, color, and quality of the fruits this species is quite variable, and some of these varieties are, according to the writer, superior in flavor and size to North American raspberries.—The canes are up to 5 m. in length, armed with recurved spines, with pinnately trifoliolate leaves, white flowers in few-flowered leafy panicles, and oblong to heart-shaped fruits, 2 to 4 cm. long, light to dark purplish red. The species resembles the black raspberry in habit and foliage, while the fruits are more like blackberries in character.—The cultivation of the berry in the U. S. A. will probably be limited to the Pacific states and parts of the southwest. Because of its vigor and the large size and good quality of the fruits it is likely to prove of value to breeders.—*P. G. Russell.*

4028. Popenoe, Wilson. **The frutilla, or Chilean strawberry.** Jour. Heredity **12:** 456–466. *5 pl.* 1921.—*Fragaria chiloensis* is considered indigenous along the Pacific coast from Alaska to southern Chile, though great differences exist between North and South American forms suggesting more than 1 species. This species is not cultivated in North America but in South America it has formed an important culture for several centuries. It was first introduced into Europe by M. Frezier, who returned to France from Chile in 1714. It is grown in every country on the west side of South America beginning at Bogotá, Colombia. It attains its maximum fruiting rate at Guachi, Ecudaor, at an elevation of about 10,000 feet. At this situation in a loose sandy soil with a rainfall of not more than 15 inches and a temperature rarely higher than 70° or lower than 35°F., the plants are never irrigated but fruit is harvested weekly throughout the year. The most abundant yields are obtained in February, August, and December. For canning and shipping purposes the Guachi strawberry far excels any of the North American varieties. In Peru and Chile there are many plantations where the plants grow vigorously but do not fruit as heavily as in Ecuador. *Fragaria chiloensis* probably is the oldest cultivated strawberry in the world having been cultivated continuously in the highlands of Peru at least since 1557, affording a striking refutation of the argument that strawberry varieties "run out." Although Duchesne states that the stamens of *F. chiloensis* are abortive, producing no pollen, the author notes that this is not true of the species as it grows in South America. Owing to climatic differences between the centers of strawberry culture of South America and the U. S. A. the author does not believe that the South American varieties will be of any value as such in the U. S. A., but their value to breeders cannot be overestimated as is shown by the work of Albert F. Etter of California.—*J. H. Kempton.*

4029. Price, J. C. C. **Grapes in Mississippi.** Mississippi Agric. Exp. Sta. Circ. 44. *4 p.* 1921.

4030. Price, J. C. C., and C. T. Ames. **Apples in north Mississippi.** Mississippi Agric. Exp. Sta. Circ. 41. *4 p., 2 pl.* 1921.

4031. Ralston, G. S. **Effect of time of application of nitrogenous fertilizers on tree growth, bloom and fruit production.** Proc. Amer. Soc. Hort. Sci. 18: 118–123. 1921 [1922].—This paper is a preliminary report without data on the effect of nitrate of soda applied in apple orchards at monthly intervals from March to August. The earlier applications gave greater growth of terminals and spurs, larger and darker colored foliage, greater yields, and increased size of fruit. The time of cessation of growth in length was not influenced by time of treatment.—*A. Lee Schrader.*

4032. Ramsey, F. T. **The Swazey barberry.** Jour. Heredity 12: 426–427. *1 pl.* 1921.—The use of the 5-leaved barberry (*Berberis Swazeyi*) as an ornamental is urged. Attention is directed to the resistance of this species to low temperatures and drought and its high productivity in fruit suitable for jelly.—*J. H. Kempton.*

4033. Read, F. W. **New standardization law on grapes a success.** Monthly Bull. California Dept. Agric. 10: 376–380. 1921.—The California New Standardization Law on Grapes has proved successful. During the 1st season, 1921, contractors in the East requested the State Department of Agriculture to certify that shipments on their orders would contain the 16 or 17 per cent of sugar. Grapes sold for by-products could be marketed with a lower sugar content if a permit was obtained from the Department. No losses occurred due to low percentage of sugar.—*E. L. Overholser.*

4034. Read, F. W. **Report of the bureau of standardization.** Monthly Bull. California Dept. Agric. 10: 598–614. 1921.

4035. Reed, C. A. **Black walnut for beauty and utility.** Amer. Nut Jour. 14: 28. 1921.—Many of the present uncultivated areas should be planted to black walnuts. Where nut production is desired trees should be budded or grafted to improved varieties.—*E. L. Overholser.*

4036. Reed, C. A. **Pecan culture in Florida.** Amer. Nut Jour. 16: 54. 1922.—For Florida conditions Bradley, Curtis, James, Moore, and President should be planted,—in very deep, rich soil and preferably 60 × 60 feet each way. If troubled with winter injury, the trunks should be protected during spells of night freezes while the trees are under 6 years of age.—*E. L. Overholser.*

4037. Reisner, John H. **Nut culture in China.** Amer. Nut Jour. 14: 17. 1921.—The principal nuts cultivated in China are: Walnuts (*Juglans regia sinensis*); chestnuts (*Castanea* sp.); apricot kernels (*Prunus armeniaca*); Gingko nuts (*Gingko biloba*); edible pine seeds (*Pinus armandi, P. bungeana,* and *P. koraiensis*); hazel nuts (*Corylus* sp.); and water chestnuts (*Trapa bicornis*),—the latter being grown in canals and ponds of central China south of the Yangtse river. Walnuts, chestnuts, and Chinese almonds (apricot kernels) are the most important nuts entering into export trade. The trees are mostly seedlings, grafting being rarely practiced; this accounts for the great variation in the quality of the Chinese product.—*E. L. Overholser.*

4038. Rixford, G. P. **Pistachio nut proves adapted to warm valleys.** Associated Grower 2^4: 47. 1921.

4039. Rolfs, P. H. **Citrus in Brazil.** Florida Grower 25^{25}: 5. 1922.—The citrus region in Brazil includes practically all of the country, though citrus growing can scarcely be considered an industry as there are very few large cities where the products can be disposed of. Most trees are seedlings. The few varieties grown are Bahia, Selecta, Tangerina, Abacaxi, Coronel, and Blanca. The fruits in highest favor are those that are sweet, high flavored, and possessing a low acid content.—*J. C. Th. Uphof.*

4040. Rose, R. E. **Immature citrus fruit.** Florida Agric. Dept. Quart. Bull 32: 20–32. 1922—Various rules and regulations have been adopted controlling the shipment of proper citrus fruit for markets.—*J. C. Th. Uphof.*

4041. Rutgers, A. A. L. **Selectie en uitdunning.** [Selection and thinning.] Arch. Rubbercult. 3: 105–118. 1919.—The author presents arguments in favor of thinning rubber plantations. He recommends removal of those trees which have the lowest production.—*Carl D. La Rue.*

4042. Schipper, A. **Der Rote Römerapfel und der Görlitzer Nelkenapfel, zwei gute Marktsorten.** [**Roter Römer apple and Görlitzer Nelken apple, two good varieties for market.**] Gartenwelt 25: 211–213. *4 fig.* 1922.—The castle of Dyck possesses several old varieties of fruit trees, mostly collected by Joseph Salm (1773–1861), among which were Rote Römer apple and Görlitzer Nelken apple. These proved resistant to drought during the dry years 1920 and 1921. The former ripens November–December; the latter October–December. The trees are free from mildew and the fruits free from *Fusicladium*.—*J. C. Th. Uphof.*

4043. Schipper, A. **Die Braune Schmalzbirne eine Massertrager.** [**The brown butter pear, a heavy producer.**] Gartenwelt 24: 241. *5 fig.* 1920.—This pear is extremely prolific, ripens in October shortly after picking, is but little attacked by fungus diseases, and misformed fruits are rare. The original tree is on the estate Dyck near Düsseldorf.—*J. C. Th. Uphof.*

4044. Schipper, A. **Esperens Herrenbirne.** [**Esperens Herren pear.**] Gartenwelt 24: 375. *2 fig.* 1920.—This pear is very productive and belongs to the Bergamotte group; the fruit is delicious and ripens from September to October.—*J. C. Th. Uphof.*

4045. Schipper, A. **Pfirsiche an Mauern und Hauswanden** [**Peaches against garden- and housewalls.**] Gartenwelt 24: 206–208. *2 fig.* 1920.—This is a description of preparing soil, planting and pruning, and varieties best adapted for growing against walls, as is generally practiced in Europe.—*J. C. Th. Uphof.*

4046. Schipper, A. **Über Herbstbirnen.** [**Autumn pears.**] Gartenwelt 24: 214–215. 1920.—The varieties Beurré Clairgeau, Gute Louise von Avranche (Louise le bonne d' Avranche), Köstliche von Charnea, Salisbury (Princess Marianne), Vereins-Dechantspear, Beurré Gillert, and Hochfeine Butterbirne (Buerre Superfin) are recommended as high class table pears ripening in the autumn.—*J. C. Th. Uphof.*

4047. Schipper, A. **Über Weinsorten für die Frühtreiberei.** [**Grape varieties for early forcing.**] Gartenwelt 24: 507–508. 1920.—The best varieties for growing in hothouses are Fosters' White Seedling, Black Hamburgh, and Buckland Sweetwater.—*J. C. Th. Uphof.*

4048. Schmidt, Richard. **Care of vines after grafting.** Associated Grower 3^5: 10. 1922.

4049. Schmidt, R. **Common mistakes in handling cuttings, vines.** Associated Grower 2^5: 18–19. 1921.—Most growers tend to make grape cuttings too long. Fourteen inches is considered a desirable length. The canes should be of medium size; the lower cut should be made directly below the node while the top cut should not be made so near the node. Canes consisting of long internodes should not be used except in cases of scarcity of canes for cuttings. In pruning, too many canes and too few spurs are commonly left.—*E. L. Overholser.*

4050. Schmidt, Richard. **Early and late table grapes worth trying.** Associated Grower 2^9: 9, 27. 1921.

4051. Schmidt, Richard. **Grafting resistant vines.** Associated Grower 2^{12}: 35. 1921.

4052. Schmidt, Richard. **Grafting young vinifera vines.** Associated Grower 2^{10}: 43. 1921.

4053. Schmidt, Richard. **Shaping the newly planted vine.** Associated Grower 3^5: 13. 1922.—Summer pruning is desirable in order to remove and shorten the young growth. Usually there should be no summer pruning during the 1st season, all leaves being necessary for proper development. If 1st season's growth is insufficient, the canes should be pruned back to 1 or 2 buds, it being desired to secure the required height in 1 season. When a vine attains the desired height in 1 season it will be straight and will contain more fruiting wood than when 2 seasons' growth is required to make the proper height.—*E. L. Overholser.*

4054. Schmidt, Richard. **Vine pruning practice.** Associated Grower 3^2: 45, 46. 1922.—The amount of growth rather than the age determines whether vines should be summer pruned the 1st season. With Muscats the crowns should be left about 12–18 inches high. Permanent spurs should be left since pruning back to the trunk causes water sprouts to appear. At least as many spurs should be left as there are to be canes. Emperors, Malagas, and Cornichons should be pruned to the "vertical or horizontal cordon."—*E. L. Overholser.*

4055. Schuster, C. E. **Pollination of filbert varieties.** Better Fruit 16^{12}: 9–11, 22. 1922.—The filbert, blossoming in mid-winter and being wind pollinated, offers many difficulties in being properly fertilized. Humidity is often the limiting factor for the proper distribution of the pollen, while extremely low temperatures may kill a large percentage of the pistilate flowers. Tests carried on by the Oregon Agricultural Experiment Station have shown that no commercial variety of filberts is self-fertile, and many of them are inter-sterile. Du Chilly is a good pollenizer for Barcelona, a popular commercial variety, but the former, in order to be profitable, must in turn be pollinized by some other variety.—*A. E. Murneek.*

4056. Shamel, A. D. **Some phases of the problem of the decline of old citrus orchards.** Monthly Bull. California Dept. Agric. **10**: 521–528. 1921.

4057. Shepherd, A. N. **Soil improvement under irrigation. Green manuring trials at Leeton, 1921.** Agric. Gaz. New South Wales **33**: 170–172. *4 fig.* 1922.—In a trial of green manuring crops in a citrus orchard in the Murrumbidgee irrigation area tick beans (*Vicia faba*) gave the best results and fulfilled the demand of such a crop in a very satisfactory manner. The yield of green material per acre of the beans was over 16 tons.—*L. R. Waldron.*

4058. Simmons, Edward. **Behavior of the Guatemalan avocado and the Chinese mango in south Florida.** Proc. Florida Hort. Soc. **1921**: 75–76. 1921.—The Trapp avocado was planted extensively until the freeze of February, 1917; after that attention was directed to the Guatemalan type. The Guatemalan race grafted on its own stock appears 10–14 days later than the South American type. The Guatemalan becomes dormant in winter. Some are now in fruit and the next cold wave should demonstrate whether this is the proper stock for this race. The Chinese mango is recommended for trial to get seedlings for securing improved strains.—*J. C. Th. Uphof.*

4059. Simmons, H. H. **Great native pecan trees discovered, in south Florida.** Amer. Nut Jour. **15**: 27. 1921.—In west central Florida on the St. Johns River many large native pecan trees 3–4 feet in diameter and 70–80 feet in height are found, and it is predicted the region will witness the development of the pecan industry.—*E. L. Overholser.*

4060. Skinner, J. J. **Soil fertility and fertilizer problems in pecan culture.** Amer. Nut Jour. **16**: 6–7, 9. 1922.

4061. Stahl, J. L. **Care of raspberries and evergreens.** Better Fruit 16^{12}: 7, 21. 1922.—General methods and detailed procedure are given for the establishment and care of red raspberries and evergreen blackberries in the famous Puyallup-Sumner district, Washington.—*A. E. Murneek.*

4062. Stahl, J. L. **Winter injury to berry plants.** Better Fruit 16^5: 10. 1921.—In western Washington bearing canes and roots of berry plants are often injured by freezing in November and December, while the young shoots are exposed to this danger in April and May. Some of the factors producing a tendency toward injury by frost are: late irrigation or early fall rains; poor drainage; continuous cultivation late in the season; neglect to thin young canes; late summer fertilizing; excessive fertilization; warm wet falls followed by low temperatures; summer drought producing weak canes. Factors having the tendency to resist or avoid frost injury are: good soil drainage; good air drainage; frequent cultivation during the early part of the growing season; early normal ripening of canes.—*A. E. Murneek.*

4063. Stiles, Harvey C. **How to guard against faulty nuts.** Amer. Nut Jour. **16**: 36. 1922.

4064. Stiles, Harvey C. **Records of noted individual nut trees.** Amer. Nut Jour. **15**: 74. 1921.—One unusual, large pecan tree is known to have produced 20,000 pounds of nuts in 20 years, and as many as 2,000 pounds in 1 year.—*E. L. Overholser.*

4065. Taylor, R. H. **Choosing a location for planting peaches.** Associated Grower 2^1: 8, 39–40. 1921.

4066. Tribolet, J. **Raisin, peach and fig growing in the Union of South Africa.** Associated Grower 3^1: 30–31. 1922.

4067. Tucker, T. C. **The California almond.** Amer. Nut Jour. 14: 10. 1921.—California is the only state in which almonds can be grown profitably. Analyses show that almonds, as compared with other commonly grown fruits and nuts, remove the largest total quantity of mineral matter from the soil. The acreage of almonds in California is constantly increasing. The almond is a deep-rooting tree requiring a deep rich soil; it generally flourishes in valleys or foothill sections.—*E. L. Overholser.*

4068. Tufts, W. P. **Pruning studies in California.** Better Fruit 16^9: 5–6, 23. 1922.—This is largely a condensed review of California Agric. Exp. Sta. Bull. 313 [see Bot. Absts. 4, Entry 948].—*A. E. Murneek.*

4069. Turk, Richard H. **The future of the American grown filbert.** Amer. Nut Jour. **16**: 33. 1922.—Previous to 1916 the U. S. A. had 150 acres of filberts; the present acreage is 600. It will require 6,000 acres producing 4,000 pounds to the acre to give a production equivalent to the present importations.—*E. L. Overholser.*

4070. Uhink, G. W. **Ernteertrag einiger Frühobstbäume. [Yield of some early fruit trees.]** Mollers Deutsch. Gärt. Zeitg. 35: 224–225. 1920.—The year 1920 gave a good harvest of various fruits. An account is given of the financial results of several individual trees of early varieties, especially of plums.—*J. C. Th. Uphof.*

4071. Uphof, J. C. Th. **Die Kultur der Moosbeeren in den Vereinigten Staaten. [Growing cranberries in the United States.]** Gartenwelt 24: 447–449. *3 fig.* 1920.—A description of cranberry growing and the principle varieties in the U. S. A. are given. In Europe only on the Isle Terschelling, Netherlands, are cranberries grown commercially. These are sent to the English markets. American varieties should be grown for trial by experiment stations.—*J. C. Th. Uphof.*

4072. Uphof, J. C. Th. **Die Pfirsich-Grosskultur in Nord-Amerika. [Peach growing in North America.]** Gartenwelt 24: 405–406. *2 fig.* 1920.

4073. Uphof, J. C. Th. **Einfluss verschiedener Stammesunterlagen ein und der selbe Art auf die Entwickelung der Obstbäume. [Influence of different types of stock of the same species upon the development of fruit trees.]** Mollers Deutsch. Gärt. Zeitg. 35: 190–191, 209–210. 1920.—This article encourages the selection of different strains of stocks of the same species for fruit trees for different environments. Examples are given of the work of Hatten, in East Malling, England. Less known species of *Malus*, *Pirus*, and *Cydonia* should be tried as stock.—*J. C. Th. Uphof.*

4074. Vendrell y Gil, Ernesto. **El Castaño del Malabar o Arbol del Pan. [The Malabar Chestnut or "Bread Tree."]** Rev. Agric. Com. y Trab. [Cuba] 5^1: 23–24. *2 pl.* 1922.—The origin of this tree (*Atrocarpus incisa* L.) is variously attributed to Asia and Oceania.

When grown from seed it is called Malabar Chestnut and the seed are cooked for food. When propagated asexually no seeds are produced; it is then called Bread Tree. The receptacle becomes expanded and fleshy, the entire seedless fruit being edible and is used by man and fed to cattle and swine. The yields are high. The tree is valuable for the wood, which is used in cabinet work; a dye is obtained from the bark, and the inner bark is used for making nets and wearing apparel.—*G. R. Hoerner.*

4075. Waldron, Max. **The planting and cultivation of groves in the Ridge Section.** Proc. Florida State Hort. Soc. **1921**: 126–128. 1921.—On the loose sands of the Ridge Section only trees on rough lemon stock should be used. Cultivating begins in February and is repeated every two weeks until the rains. Once during the summer the cover crop is mowed.—*J. C. Th. Uphof.*

4076. Ward, E. N. **Horticulture.** Agric. Gaz. New South Wales **33**: 355–359. 1922.—Topics of flower, fruit, and vegetable growing are discussed in a popular manner.—*L. R. Waldron.*

4077. Watts, R. L. **A national program for the promotion of nut culture.** Amer. Nut Jour. **15**: 60–61. 1921.—It is argued that the general public should be educated to the value of nuts as human food by courses in agricultural colleges and through the extension service. For experiment stations a staff of nut culturists is proposed to do investigational work.—*E. L. Overholser.*

4078. Way, A. E. **Grower prunes Emperors by Cordon method.** Associated Grower **2**^{3}: 23. 1921.

4079. Way, A. E. **Pruning Thompson seedless vines.** Associated Grower **2**^{1}: 19, 42. 1921.—The extent of pruning should be determined from the growth of the preceding year. A test for frost should be made before pruning by examining the cambium. The canes chosen for bearing wood should be medium-sized, well matured wood, 2–6 canes being left according to the strength of the vine. The spurs left should be as nearly parallel to the vines as possible.—*E. L. Overholser.*

4080. Whitten, J. C. **Long pruning.** Monthly Bull. California Dept. Agric. **10**: 545–547. 1921.

4081. Whitten, J. C. **Long pruning of deciduous fruit trees.** Associated Grower **2**^{12}: 7, 19, 53. 1921.—In California there are 2 distinct methods of pruning deciduous fruit trees: (1) reducing the tree severely by annual "heading back" or cutting the current year's growth to short stubs (a standard practice current in most orchards); (2) reducing the tree slightly by thinning out surplus branches, especially those which cross or interfere in the center of the tree. No heading back is practiced unless necessary the 1st winter to establish even development of about 6 main limbs properly spaced. Pruning mainly by thinning out, rather than by heading back, is referred to by many fruit growers as the "long pruning system." About half the fruit growers of California now practice the new or "long" method of pruning.—*E. L. Overholser.*

4082. Whitten, J. C. **Response of deciduous fruit trees to pruning.** Monthly Bull. California Dept. Agric. **10**: 372–375. 1921.

4083. Wiesner, H. **Wie gedeiht Birne auf Apfeledelsorte? [How does the pear behave on apple?]** Gartenwelt **24**: 338. 1920.—The 1st year pears budded on apple seedlings may produce strong shoots, the 2nd year growth is less, and the 3rd year they usually die. Scion and stock unite but slightly, but a well developed callus is sometimes produced. *Sorbus aucuparia* used as stock of pears also failed.—*J. C. Th. Uphof.*

4084. Youngken, Heber W. **Strawberries at the North Pole and apples at the Equator.** Amer. Jour. Pharm. 94: 4–18. 1922.—The paper represents the text portion of an illustrated lecture in which are discussed the various methods of food preservation, including drying, salting, pickling, smoking, refrigeration, canning, and dehydration, with special emphasis on the last. The author mentions 4 methods of dehydration, namely, the Tunnel system, vacuum method, the kiln method, and by the utilization of special dehydrators. He points out the disadvantages of canned foods due the destruction of the vitamines by the canning processes, and states that in dehydrated foods the vitamines are not destroyed. Additional advantages of dehydrated foods are: saving of cold storage charges, lessened transportation charges, and superior keeping qualities. The author states that it is now conceivable that in the next decade dehydration of foods will outstrip other processes of food preservation in the U. S. A. The various methods are commented upon with additional notes on present day conditions in food preservation.—*Anton Hogstad, Jr.*

4085. Ziegler. **Massnhamen für die züchterische Verbesserung des weissen Burgunders.** [Measures for improvement by breeding of the white Burgundy grape.] Mitteil. Deutsch. Landw. Ges. 37: 280–282. 1922.—The author mentions the states and sections of Germany in which the white Burgundy is cultivated either in pure or in mixed stands and reviews the efforts that have been made in selection and breeding as well as the lines along which further work should be done.—*A. J. Pieters.*

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4086. Anonymous. **[Notes.]** Rhododendron Soc. Notes 2: 51–90. 1921 [1922].—The numbers for the year consists of 17 mostly short notes contributed by members of the Society; 14 of these notes deal chiefly with the ornamental qualities, flowering, behavior, hardiness, cultivation, etc., of rhododendrons in various places in Great Britain. [See also Bot. Absts. 10, Entry 163.]—*Alfred Rehder.*

4087. Anonymous. **Old garden flowers. III.** Amer. Bot. 28: 49–52. 1922.

4088. Anonymous. **Roadside tree planting.** Amer. Nut Jour. 15: 18. 1921.—On account of the great variation in climatic conditions in the U. S. A. no single species is adapted for universal use as a roadside tree. The walnut and elm, in the opinion of G. H. Collingwood, are excluded because of insect pests. Some variety of oak is considered most satisfactory. Nut trees would not be so objectionable as fruit trees. Planting should follow permanent road construction. Experience in Pennsylvania, where extensive road planting has been done, shows that, including overhead charges, $25,000 will plant 2,500 trees, or about 12 miles of highway.—*E. L. Overholser.*

4089. Anonymous. **The seeding and care of golf courses.** *54 p.* O. M. Scott & Sons Co.: Marysville, Ohio. 1922.—This is a popular treatise dealing with the making and maintaining of a desirable turf. Short chapters are devoted to turf problems, soil, making the fairway, building the putting green, care of the turf, fertilizers, weeds, and turf grasses.—*Mary R. Burr.*

4090. Ames, Oakes. **Eria gigantea.** Addisonia 6: 41, 42. *Pl. 213* (*colored*). 1921.—This is a species of the orchid family native of the Philippine Islands, originally described in 1905 from Mt. Mariveles, Luzon. It is an upright herb, 3–4 feet high, leafy, of vigorous growth, and responds readily to cultivation.—*T. J. Fitzpatrick.*

4091. Bailey, L. H. **Magnolia stellata.** Addisonia 6: 37, 38. *Pl. 211* (*colored*). 1921.—The starry magnolia is a native of Japan and was introduced into the U. S. A. in 1862. The species is a deciduous shrub or small tree, highly ornamental, blooming in April or May, and is hardy in New York or New England.—*T. J. Fitzpatrick.*

4092. Bean, W. J. [Rev. of: Wilson, E. H., and Alfred Rehder. **A monograph of Azaleas.** *219 p.* Cambridge, Massachusetts, 1921.] Rhododendron Soc. Notes **2:** 53–62. 1921 [1922].

4093. Bergmans, J. **Les Astilbes nouveaux.** [**New Astilbes.**] Rev. Hort. **93:** 431. 1921.—The varieties Grenat, garnet red; Bergcristall, white; Diamant, white; Hyacinthe, lilac rose; Amethyst, deep lilac rose, Rubis, brilliant red, are of superior merit.—*E. J. Kraus.*

4094. Bicknell, E. P. **Hypopitys insignata.** Addisonia **6:** 25, 26. *Pl. 205* (*colored*). 1921.—This local species known as the crimson pine-sap was first differentiated by Bicknell in 1914, and so far is known only from the coastal region of Massachusetts and Long Island. The plant occurs in dry oak woodlands or in low ground under red maples. It is a saprophyte, appears late, blooms in September and October, and remains upright with the seed pods throughout the winter.—*T. J. Fitzpatrick.*

4095. Blot, F. **Chrysanthèmes anciens et nouveaux.** [**Chrysanthemums old and new.**] Rev. Hort. **93:** 414–415. *1 pl.* (*colored*). 1921.—Le Beaujolais, Le Sologne, La Beauce, La Puisaye, Le Forez, all to be introduced by Vilmorin-Andrieux in 1922, are described.—*E. J. Kraus.*

4096. Blot, F. **Chrysanthèmes pour expositions.** [**Chrysanthemums for exhibition.**] Rev. Hort. **93:** 385–387. *Fig. 101–102.* 1921.

4097. Boynton, K. R. **Bergenia crassifolia.** Addisonia **6:** 43. *Pl. 214* (*colored*). 1921. —This is a thick-leaved saxifrage, native of Siberia. It does well in moist pockets in rookeries; the pink flowers appear quite early and are very ornamental.—*T. J. Fitzpatrick.*

4098. Boynton, K. R. **Bergenia ligulata.** Addisonia **6:** 29. 1921.—This fringe-leaved saxifrage is native of the Himalayas and was introduced into cultivation from Nepal in 1821. Propagation is best effected by cuttings from the rootstalk. The plants are hardy, need little protection in winter, and are at their best in crevices or pockets in rookeries.—*T. J. Fitzpatrick.*

4099. Boynton, K. R. **Helichrysum bracteatum.** Addisonia **6:** 45. *Pl. 215* (*colored*). 1921.—This annual species of the thistle family was introduced from western Australia into European gardens about 1799. It grows readily, seeds freely, has a long blooming period and a wide range of coloring, and is vigorous even during hot summers.—*T. J. Fitzpatrick.*

4100. Boynton, K. R. **Physalis franchetii.** Addisonia **5:** 57, 58. *Pl. 189* (*colored*). 1920.—The Chinese lantern plant is ornamental because of its fruit and fruiting calyx. It was introduced into Europe in 1893 and is now frequently cultivated in gardens.—*T. J. Fitzpatrick.*

4101. Boynton, K. R. **Rudbeckia laciniata.** Addisonia **5:** 51, 52. *Pl. 186* (*colored*). 1920.—This cone flower, a native of the U. S. A. and Canada, has been in cultivation nearly 3 centuries. One variety is the double form known as "golden glow," a creation of John Lewis Childs about 1894. This plant is of easy culture and does well in many soils, growing as high as 10 feet in moist locations.—*T. J. Fitzpatrick.*

4102. Britton, E. G. **Clerodendron Thomsonae.** Addisonia **6:** 39, 40. *Pl. 212* (*colored*). 1921.—This ornamental vine, a member of the Vervain family, is a native of the west coast of Africa, having been discovered in 1861 by Rev. W. C. Thomson at Old Calabar in the delta of the Niger, where it was abundant. It may be propagated by cuttings or grown from seed. It is quite ornamental because of its showy and decorative inflorescence. This species has been introduced into Bermuda, West Indies, and Trinidad. A number of other ornamental species of *Clerodendron* are commented upon.—*T. J. Fitzpatrick.*

4103. Britton, N. L. **Lathyrus latifolius.** Addisonia 6: 35. *Pl. 210 (colored).* 1921.—This highly ornamental pea is a native of Europe. It is much cultivated in the U. S. A., where it sometimes occurs as an escape from southern New England to Virginia.—*T. J. Fitzpatrick.*

4104. Brooks, Jos. R. **Grass culture as applied to golf course construction in Florida.** Proc. Florida State Hort. Soc. **1921**: 28–33. 1921.—On the heavier, newly cleared soils, Bermuda grass produces a good turf without fertilizer for the first 2 or 3 years. The lighter soils do not afford what golfers term "a good stance" or foothold, no matter how heavily fertilized. St. Lucie grass is preferable for fairways. St. Augustine grass (*Stenotaphrum glabrum*) makes an excellent turf, even on very poor soils without fertilizer; but it is a little too coarse and the runners which it continuously puts out divert the ball. Italian rye sown in October proved to be a very good grass; also a mixture of Red Top, Red Fescue, and Italian rye.—*J. C. Th. Uphof.*

4105. Cayeux, F. **Arabis Corbeille d'Argent à grande fleur rose vif. [A large flowered, intense rose Arabis.]** Rev. Hort. **93**: 372–373. *1 pl. (colored).* 1921.—From a cross of *A. alpina grandiflora superba* by *A. alpina rosea*, and subsequent crossing and selection of the offspring, plants which produced large flowers in various shades of rose were secured.—*E. J. Kraus.*

4106. Esbjerg, N. **Lae og Hegnsplantning. [Planting of fences and windbreaks.]** Haven **21**: 137–144. 1921.

4107. Findeisen, Theodor. **Eine Azalea-Neuheit. Azalea indica Theodor Findeisen. [An Azalea novelty.]** Gartenwelt **26**: 192–193. *2 fig.* 1922.—*Azalea indica* Theodor Findeisen is a sport of Mme. Petrick. The former has light salmon pink flowers.—*J. C. Th. Uphof.*

4108. Fischer-Sigwart, H. **Stratiotes aloides L. bei Zofingen. [Stratiotes aloides at Zofingen.]** Vierteljahrsschr. Naturf. Ges. Zurich **64**: 834–836. 1919.—This species was transplanted into an old pond and developed abundantly, even threatening to crowd out all other water plants. The plant multiplies by the separation of offshoots.—*John H. Schaffner.*

4109. Gadeceau, E. **Pittosporum Mayi.** Rev. Hort. **93**: 433. *Fig. 117.* 1921.

4110. Graebner, P. **Erziehung der Zwergbäume. [The culture of dwarf trees.]** Naturwissenschaften **10**: 181–183. *Fig. 1.* 1922.—This is a discussion of the principles underlying the growing of dwarf trees based on the practice of the orientals, who for centuries have been lovers of the miniature trees developed by the patient care of their gardeners. Many of the oriental dwarf trees of reputed great age (100–400 years) have been found on examination of the annual rings to be not over 50 years old.—*Orton L. Clark.*

4111. Heede, A. van den. **Rusticité du Lophospermum scandens. [Hardiness of L. scandens.]** Rev. Hort. **93**: 396. *Fig. 105.* 1921.

4112. Heydt, Adam. **Kulturerfahrungen über die wichtigsten Handels-Orchideen. IV. Coelogynen. [Cultural results of the most important commercial orchids. IV. Coelogynes.]** Möllers Deutsch. Gärt. Zeitg. **37**: 87. 1922.

4113. Heydt, Adam. **Kulturerfahrungen über die wichtigsten Handels-Orchideen. V. Vanda. [Cultural results of the most important commercial orchids. V. Vanda.]** Möllers Deutsch. Gärt. Zeitg. **37**: 113–114. 1922.—*Vanda suavis*, *V. tricolor*, and *V. Lowii* flower in spring, whereas *V. Kimballiana* and *V. coerulea* flower in autumn. They are of great importance for cut flowers and other decorations. It is emphasized that *V. coerulea* and *V. Kimballiana* require more fresh air in the greenhouse than do the other three.—*J. C. Th. Uphof.*

4114. Howe, M. A. **Dahlia "Ami Nonin."** Addisonia 6: 51, 52. *Pl. 218* (*colored*). 1921.—This is a variety of the "collarettes" class, originated in 1908 by André Charmet of Monplaisir, France, and offered to the public in 1910. Notes on similar varieties are included.—*T. J. Fitzpatrick.*

4115. Howe, M. A. **Dahlia "dahliadel century."** Addisonia 6: 49, 50. *Pl. 217* (*colored*). 1921.—This is a cultivated variety of *Dahlia pinnata*, with the rays white and in a single series, originated by W. W. Maytrott, of Vineland, New Jersey, and placed on sale in 1918. Some account is included concerning Dahlia culture and of the botanical history of the genus *Dahlia.*—*T. J. Fitzpatrick.*

4116. Howe, M. A. **Dahlia "Douglas Tucker."** Addisonia 6: 63, 64. *Pl. 224* (*colored*). 1921.—This is a variety placed in the "pompon" group of the "ball-shaped" class of dahlias, first placed on the market in 1913. The article gives a description of the variety; also notes on the history of the class to which it belongs.—*T. J. Fitzpatrick.*

4117. Howe, M. A. **Dahlia "king of the autumn."** Addisonia 6: 59, 60. *Pl. 222* (*colored*). 1921.—This is a variety of the "decorative" class, originated by H. Hornsveld of Baarn, Holland, exhibited in 1915 and placed on sale in 1917. A full description of the variety and a short history of the class are given.—*T. J. Fitzpatrick.*

4118. Howe, M. A. **Dahlia "Marguerite Clark."** Addisonia 6: 55, 56. *Pl. 220* (*colored*). 1921.—This is a variety of the "peony-flowered" class, originated by George L. Stillman, of Westerly, Rhode Island, and placed on sale in 1915. Some historical notes are given.—*T. J. Fitzpatrick.*

4119. Howe, M. A. **Dahlia "Miss Nannie B. Moor."** Addisonia 6: 57, 58. *Pl. 221* (*colored*). 1921.—This is a variety of the "cactus" class, originated in 1914 by J. J. Broomall, of Eagle Rock, California. A history and description of the class are given, with a full description of the variety.—*T. J. Fitzpatrick.*

4120. Howe, M. A. **Dahlia "Mme. J. Coissard."** Addisonia 6: 53, 54. *Pl. 219* (*colored*). 1921.—This is a variety of the "duplex" class, of recent introduction, largely distributed by André Charmet. This variety won the gold medal of the National Dahlia Society of Great Britain in 1911. Some historical notes are given.—*T. J. Fitzpatrick.*

4121. Howe, M. A. **Dahlia "W. W. Rawson."** Addisonia 6: 61, 62. *Pl. 223* (*colored*). 1921.—This is a variety of the "ball-shaped" type of dahlias, originated by A. E. Johnson of Brockton, Massachusetts, and placed on the market in 1907. The article includes a full description with notes and comments on the group to which the variety belongs.—*T. J. Fitzpatrick.*

4122. Janke, Gustav. **Adiantum-Neuheit "Ruhm von Dresden." [Adiantum novelty—Ruhm von Dresden.]** Möllers Deutsch. Gärt. Zeitg. 37: 86–87. 1922.—This variety is grown as are other *Adiantum* species. It can not be grown from spores, but is propagated by division. It produces big leaves and intense black stems.—*J. C. Th. Uphof.*

4123. Judd, William H. **Some newer trees and shrubs.** Park and Cemetery 32^{3}: 62–64. 1922.—The author lists and briefly describes some of the more recent introductions which are notable for their foliage or flowering. The list is compiled from the plantings at the Arnold Arboretum (Cambridge, Massachusetts) and covers flowering trees and shrubs for practically the entire year.—*J. H. Gourley.*

4124. Kache, Paul. **Rhododendron praecox.** Gartenwelt 25: 68–69. *2 fig.* 1921.—This hybrid between *R. dahuricum* and *R. ciliatum* flowers out-of-doors early in March. It is also suitable for forcing and will flower at Christmas time. It is propagated from cuttings taken from half-matured shoots and kept in boxes in a cold greenhouse during the winter. Heather soil or peat is best for its development.—*J. C. Th. Uphof.*

4125. Karrer, S. **Anemonenblütige Cyclamen. [Anemone-flowered Cyclamen.]** Möllers Deutsch. Gärt. Zeitg. 36: 13. *1 fig.* 1921.—This form is an improvement of the Lemania Cyclamen. The flowers stand erect instead of drooping.—*J. C. Th. Uphof.*

4126. Leray, C. **Le lis rouge du Kamaon. [The red lily of Kamaon.]** Rev. Hort. 93: 388–389. *Fig. 103–104.* 1921.—This article gives descriptive and cultural notes on *Lilium Thomsonianum.*—*E. J. Kraus.*

4127. Löbner, M. **Eintriebige Hortensien. [One-stemmed Hortensias.]** Möllers Deutsch. Gärt. Zeitg. 37: 95–96. 1922.—It is more economical to raise flowering Hortensias of one shoot. Cuttings are taken in June. In rich soil they produce large inflorescences; they can also be easily forced in winter. Mouillière (Truffault), Heinrich Lambert and Westphalenkind are most suitable for forcing.—*J. C. Th. Uphof.*

4128. Löbner, M. **Magnolia Loebneri.** Möllers Deutsch. Gärt. Zeitg. 35: 69–70. *5 fig.* 1920.—*Magnolia Loebneri* is a garden hybrid between *M. stellata* and *M. Kobus* and flowered for the 1st time in the spring of 1917 in Bonn.—*J. C. Th. Uphof.*

4129. Lowe, Max. **Eine deutsche Hortensia-Züchtung, die sich hervorragend zur Blaufarbe eignet. [A German Hortensia-breeding result which is of prime importance for blue coloring.]** Gartenwelt 24: 233–234. *5 fig.* 1920.—Dlabka Beste belongs to the best varieties, has high commercial value, can compete with the best French varieties, and produces excellent blue flowers.—*J. C. Th. Uphof.*

4130. M. **Die Vermehrung der Nadelhölzer. [Propagation of conifers.]** Gartenwelt 24: 360–362. *1 fig.* 1920.—The following are propagated from cuttings: juvenile forms of *Chamaecyparis pisifera, C. squarrosa, C. plumosa,* and *Thuja occidentalis;* also forms and varieties of *Juniperus* and dwarf varieties of *Picea excelsa.* Cuttings are made late in August. Small slips, 10–15 cm., are torn from the twigs and the wounds smoothed with a knife. The cutting is inserted a few cm. in soil composed of equal parts of leaf mould, peat, and sand. The soil must be loose, moist, and of moderate temperature. In February the cuttings will be rooted or at least have made some callus. Each cutting is then potted in a similar soil and placed in a warm bed, remaining until autumn.—Conifers are often grafted from September to December and from February to March. In spring, stocks 2–4 years old are put in pots and 4 weeks before grafting are placed in the propagating house at 12–15°C. *Abies* and *Picea* varieties are better propagated in spring.—Conifers are mostly propagated by side-grafting. *Cupressus* and *Chamaecyparis* varieties are grafted on *Chamaecyparis Lawsoniana;* all *Thuja* species, forms, and varieties on *T. occidentalis; Thujopsis* on *Biota orientalis;* all forms of *Juniperus virginiana on J. virginiana;* exotic *Larix* species on *L. europaea; Abies* species on *A. pectinata; Picea* on *P. excelsa,* but *P. pungens glauca* and *P. Engelmanni* on *P. alba*; *P. Omorika* grows well on *P. orientalis; Taxus* species on *T. baccata; Pinus* species with 5 needles on *P. Strobus,* with 2 needles on *P. sylvestris.*—*J. C. Th. Uphof.*

4131. Maas, J. G. J. A. **The vegetative propagation of Hevea brasiliensis.** Arch. Rubbercult. 3: 279–287. 1919.—The advantages of vegetative propagation as a means of increasing yield of rubber are briefly stated. Methods of propagating by grafting, budding, and marcotting are described.—*Carl D. La Rue.*

4132. Mulford, F. L. **Planting and care of street trees.** U. S. Dept. Agric. Farmers Bull. 1209. *34 p., 9 fig.* 1921.

4133. Müller, Gustav, **Cyclamen anemoniflorum, Anfänge einer neuen Entwickelungslinie in der Cyclamenzucht.** [Cyclamen anemoniflorum, a new development in Cyclamen breeding.] Möllers Deutsch. Gärt. Zeitg. 36: 13–14. 1921.—This new type, producing upright instead of drooping flowers, should be improved and crossed with other Cyclamen forms in order to obtain different colored flowers in this new anemoniflorum type.—*J. C. Th. Uphof.*

4134. Müller, Gustav. **Die neuen Treibrosen, Wilhelm Kordes und S. S. Pennock (Kordes 1922).** [The new roses for forcing, Wilhelm Kordes and S. S. Pennock (Kordes 1922).] Möllers Deutsch. Gärt. Zeitg. 37: 133. *2 fig.* 1922.—Wilhelm Kordes is a hybrid between Adolf Koschel and Gorgeous, the flowers being capucine—red on a golden background. S. S. Pennock is a hybrid between Mrs. Geo. Shawyer and Lieutenant Chauré, the flowers being large and on long stems; it is an improvement on Mrs. Geo. Shawyer. Both varieties are suitable for forcing.—*J. C. Th. Uphof.*

4135. Nash, G. V. **Acacia armata.** Addisonia 6: 13. *Pl. 199* (*colored*). 1921.—This Acacia, known as the kangaroo thorn, is a native of southern Australia. It is a shrub of dense habit with rich green foliage and globose heads of bright yellow flowers. It was introduced into cultivation in 1803 by Peter Good. Excellent results are obtained when potted or planted out in cool conservatories. In regions where it may be grown in the open it makes a good hedge plant and it has been used to reclaim sand dunes.—*T. J. Fitzpatrick.*

4136. Nash, G. V. **Acacia leprosa.** Addisonia 6: 7. *Pl. 196* (*colored*). 1921.—This species, known as the climbing Acacia, is a tall shrub and native of New South Wales and Victoria. It may be propagated in cool houses and trained on columns or against walls.—*T. J. Fitzpatrick.*

4137. Nash, G. V. **Acacia lineata.** Addisonia 6: 15. *Pl. 200* (*colored*). 1921.—This is a low bushy shrub, native of southeastern Australia, with slender branches and numerous globose heads of yellow flowers. It may be grown as a pot herb or planted out.—*T. J. Fitzpatrick.*

4138. Nash, G. V. **Acacia longifolia floribunda.** Addisonia 6: 11. *Pl. 198* (*colored*). 1921.—This graceful shrub is a native of New South Wales and Victoria and is considered one of the best of the Acacias for cultivation as a flowering plant. It may be grown in pots or planted out in cool conservatories.—*T. J. Fitzpatrick.*

4139. Nash, G. V. **Acacia Nabonnandi.** Addisonia 6: 9. *Pl. 197* (*colored*). 1921.—This Acacia is a hybrid of *A. dealbata* and *A. decurrens*, and originated in the littoral of the Mediterranean. The plant is a shrub and may be grown in cool greenhouses. It was named after M. Nabonnand, the noted creator of many new roses.—*T. J. Fitzpatrick.*

4140. Nash, G. V. **Acacia pubescens.** Addisonia 6: 3, 4. *Pl. 194* (colored). 1921.—The hairy wattle, a native of New South Wales, was introduced into England about 1790 by Sir Joseph Banks. The species is a graceful ornamental shrub and may be grown in pots or planted out.—*T. J. Fitzpatrick.*

4141. Nash, G. V. **Acacia pulchella.** Addisonia 6: 5. *Pl. 195* (*colored*). 1921.—This Acacia is a native of West Australia, and was introduced into cultivation about 1803. The species is a low glabrous shrub of dense habit and much branching. It may be grown as a pot plant or planted out in a cool conservatory.—*T. J. Fitzpatrick.*

4142. Nash, G. V. **Acacia scapuliformis.** Addisonia 6: 1, 2. *Pl. 193* (*colored*). 1921.—This is a large shrub, native of New South Wales, recently introduced into the U. S. A. In mild climates it may be used as a hedge plant. Propagation may be effected by seed cuttings, or grafting. Besides a description of the species the article contains information about the genus and remarks on various other species.—*T. J. Fitzpatrick.*

4143. Nash, G. V. **Koelreuteria paniculata.** Addisonia **5**: 61, 62. *Pl. 191* (*colored*). 1920.—The varnish tree, family Sapindaceae, is a native of Japan, Corea, and China. The flowers appear in July and August and the bladdery fruit in September. It does well in sunny situations and in most soils, and is frequently grown from Kansas and Missouri southward, though usually hardy as far north as New York and Massachusetts.—*T. J. Fitzpatrick.*

4144. Nash, G. V. **Malus ioensis plena.** Addisonia **6**: 31. *Pl. 208* (*colored*). 1921.—This is an unusual form of the Iowa crab apple, having double flowers with roseate tints and pleasing fragrance. This form was found at Staunton, Illinois, and introduced into cultivation about 1891.—*T. J. Fitzpatrick.*

4145. Nash, G. V. **Malus niedzwetzkyana.** Addisonia **6**: 23, 24. *Pl. 204* (*colored*). 1921.—This is a small apple tree native of southeastern Siberia and Caucasus. It is a striking tree of irregular habit; all parts partake of some shade of red. During recent years this apple has been cultivated at the Royal Gardens, Kew, and at the New York Botanical Garden.—*T. J. Fitzpatrick.*

4146. Nash, G. V. **Pterostyrax hispida.** Addisonia **5**: 59, 60. *Pl. 190* (*colored*). 1920.—The hispid winged storax is a small or medium sized tree, native of Japan. It does well in sandy loam soil of medium fertility and in sheltered situations is hardy as far north as Massachusetts. The flowers appear in June and are very ornamental.—*T. J. Fitzpatrick.*

4147. Nash, G. V. **Pinus densiflora.** Addisonia **6**: 27, 28. *Pl. 206* (*colored*). 1921.—The Japanese red pine is native of the central mountains of Japan. It is extensively cultivated in Japan south of Yeso. It was introduced into Holland by Siebold in 1854, into England by Veitch in 1861, and is also cultivated in the U. S. A. The Japanese have developed many varieties.—*T. J. Fitzpatrick.*

4148. Nash, G. V. **Pinus Thunbergii.** Addisonia **5**: 55, 56. *Pl. 188* (*colored*). 1920.—This black pine is a native of Japan. It was introduced into Europe in 1855, into Great Britain in 1861, and later into the U. S. A. The species grows readily in poor or rich soil and fills a desirable place in landscape work.—*T. J. Fitzpatrick.*

4149. Nash, G. V. **Rosa "Edith Cavell."** Addisonia **5**: 49. *Pl. 185* (*colored*). 1920.—The "Edith Cavell" rose was originated by Jan Spek of Boskoop, Holland, and soon after introduced into the U. S. A. It blossoms freely in early summer and again in the fall with scattering bloom between the periods. The blossoms are bright scarlet overlaid with crimson.—*T. J. Fitzpatrick.*

4150. Pennell, F. W. **Alonsoa caulialata.** Addisonia **6**: 21, 22. *Pl. 203* (*colored*). 1921.—This species of the figwort family is a native of the cool upper slopes of the Andes of Ecuador and is known as the white cascabel. The species is described and also contrasted with the orange cascabel, taken from like situations in Colombia, which was previously illustrated and described.—*T. J. Fitzpatrick.*

4151. Pennell, F. W. **Penstemon secundiflorus.** Addisonia **5**: 53, 54. *Pl. 187* (*colored*). 1920.—This beard-tongue is a native of the eastern slope of the central Rocky Mountains. A full description is given with habitat, range, and remarks on related species. By error the species illustrated is *Penstemon unilateralis* Rydb. See Addisonia **6**: 64.—*T. J. Fitzpatrick.*

4152. Peters, C. **Primula Juliae.** Gartenwelt **24**: 217. *1 fig.* 1920.—This is a small acaulescent *Primula*, originally from Transcaucasia, suitable for rock-gardens. Many plants should be grown together. It flowers abundantly in early spring, preferring cool, half shady situations. It propagates easily by runners.—*J. C. Th. Uphof.*

4153. Pratt, Merritt B. **Shade and ornamental trees of California.** *132 p., 137 illus.* California State Bd. Forest. 1922. *$2.50.*—A great many historical and legendary notes as well as scientific data concerning the more important trees used for shade and ornament in California are popularly presented. The purpose of the publication, as stated in the introduction, is to stimulate more widespread interest in the planting of trees in California, and to this end lists of trees for the 4 regions of the state are given, grouped according to their suitability for highways, lawns and streets, and windbreaks.—*Woodbridge Metcalf.*

4154. Proschowsky, A. Robertson. **Palms of the Riviera.** Gard. Chron. 71: 34. 1922. —This article gives notes on the species of *Jubaea* and *Trachycarpus*, and figures *T. excelsus.*—*P. L. Ricker.*

4155. Rache, Paul. **Chrysanthemum in Häusern ausgepflanzt. [Chrysanthemums planted out in greenhouses.]** Möllers Deutsch. Gärt. Zeitg. 37: 93–94. 1922.

4156. Reasoner, N. A. **Little known plant materials and their use in securing tropical effects.** Proc. Florida State Hort. Soc. 1921: 41–49. 1921.—The palm is one of the primary motifs in the tropical landscape. One of the handsomest species is *Acrocomia totai.* On account of its long, sharp thorns, it is not very suitable for parkways; for private estates it is effective for creating backgrounds. *Cocos plumosa* is also suitable for this purpose as well as for street planting. In south Florida *Archontophoenix Alexandrae, Arenga saccharifera, Dictyosperma rubra, Elaeis guineensis,* and *Hyophorbe Verschaffelti* deserve attention. Hardier materials are *Sabal Blackburiana* and *S. havenensis. Phoenix sylvestris* grows more rapidly on poor soils than does *P. canariensis.* Of the hardy dwarf palms, *Livistona chinensis, Raphidophyllum hystrix,* and *Trachycarpus* (*Chamaerops*) *excelsa* are mentioned. *Delonix regia,* a low branching and very spreading tree, is desirable for shade; *Grevillea robusta* is good for street planting; *Casuarina equisetifolia* is salt resistant; *Cinnamomum camphora, Eucalyptus robusta,* and *E. rostrata* are mentioned; *Callitris verrucosa* grows well on the poorest white sand. Among vines, *Allamanda Hendersoni, Antigonon leptopus, Bougainvillea glabra Sanderiana, Gelsemium sempervirens,* and *Pyrostegia venusta* are mentioned. A table of common plant materials and their uses is given.—*J. C. Th. Uphof.*

4157. Rose, J. N. **Epiphyllum Hookeri.** Addisonia 5: 63, 64. *Pl. 192* (*colored*). 1920.—This plant of the cactus family is a native of Trinidad but is in frequent cultivation in gardens and conservatories. The flowers appear at night.—*T. J. Fitzpatrick.*

4158. Small, J. K. **Cercis chinensis.** Addisonia 6: 33, 34. *Pl. 209* (*colored*). 1921.—This red bud is a native of China, where it is a tree; in cultivation it is a shrub. The flowers are of deep pink color, appear early in the spring, and where the planting is in partial shade there is a pronounced visual effect.—*T. J. Fitzpatrick.*

4159. Small, J. K. **Coreopsis pubescens.** Addisonia 6: 19, 20. *Pl. 202* (*colored*). 1921. —This species is native of southeastern U. S. A. and was first characterized by Elliott in 1823. It is of easy culture and has long been cultivated; the foliage, color of flowers, and the long period of flowering make it very desirable for flower gardens.—*T. J. Fitzpatrick.*

4160. Small, J. K. **Gaylussacia brachycera.** Addisonia 6: 17, 18. *Pl. 201* (*colored*). 1921.—The box-huckleberry is native of eastern Pennsylvania and the coastal plain of Maryland and Delaware. It occurs rarely as only 4 localities are known. The species was discovered by André Michaux, near the close of the 18th century, in Virginia, a locality now lost. The holly-like leaves, the bright pink flowers, and the blue fruit give the plant desirable properties, but so far cultivation has not been successful.—*T. J. Fitzpatrick.*

4161. Small, J. K. **Monarda didyma.** Addisonia 6: 47, 48. *Pl. 216* (*colored*). 1921.—This is a species of the mint family native of eastern North America. The brilliant red flower clusters make it a desirable ornamental species, and it was introduced into Europe as early as the beginning of the 18th century. The aborigines and early pioneers brewed a tea from the leaves.—*T. J. Fitzpatrick.*

4162. UPHOF, J. C. TH. **Blumenzwiebelnkulturen in den Vereinigten Staaten. [Flower-bulb growing in the United States.]** Möllers Deutsch. Gärt. Zeitg. **36:** 142–143, 152–153. *2 fig.* 1921.

4163. UPHOF, J. C. TH. **Kuhl und Gefrierindustrie im amerikanischen Obstbau. [Cooling and refrigeration in America fruit growing.]** Gartenwelt **24:** 375–378. *1 fig.* 1920.

4164. WARD, E. N. **Cottage landscape gardening.** Agric. Gaz. New South Wales **32:** 895–900. 1921; **33:** 61–65, 137–141, 217–220. *6 fig.* 1922.—Various designs are presented with detailed instructions for arrangement and planting. A large number of plants are suggested, both native and introduced. The suggested native plants are procurable from nurserymen.—*L. R. Waldron.*

4165. WILLIAM, J. C. **Some cherries for woodlands.** Rhododendron Soc. Notes **2:** 86–87. 1921 [1922].—Some tree-like species of Chinese and Japanese *Prunus*, mostly of recent introduction, are recommended as companions to flowering shrubs in woodlands.—*Alfred Rehder.*

4166. WILLIAMS, P. D. **Conversion of woodland into shrubbery.** Rhododendron Soc. Notes **2:** 89–90. 1921 [1922].—The author recommends a number of evergreen shrubs suited to change woodlands formerly used chiefly as game preserves into ornamental plantations; the shrubs selected are adapted only to the warmer parts of Great Britain.—*Alfred Rehder.*

4167. WILSON, E. H. **Notes from Australasia, III. The Hobart botanical gardens.** Jour. Arnold Arboretum **3:** 51–55. 1921 [1922].—A short historical account of the Gardens, which were founded in 1818, is given and the principal trees now growing in the Gardens are enumerated.—*Alfred Rehder.*

4168. WOLF, GUSTAV. **Deutsche Schnittnelken das ganze Jahr ohne teure Häuser. [German carnations for cut flowers during the entire year without expensive greenhouses.]** Möllers Deutsch. Gärt. Zeitg. **35:** 93–94. *2 fig.* 1920.—This article contains general cultural directions for carnation growing in Germany. A description is given of the newer German carnation varieties: Liane, with large pink flowers; Vulkan, with red flowers; Sonnenjungfer, with large yellow flowers; Schneelawine, with large creamy white flowers, which also develops good flowers during cool weather.—*J. C. Th. Uphof.*

4169. ZÖRNITZ, H. **Astilbe Arendsi. Neuheiten für Herbst 1920. [Astilbe Arendsi. Novelties for autumn 1920.]** Möllers Deutsch. Gärt. Zeitg. **35:** 177–178, 181–182, 222. *8 fig.* 1920.—Descriptions of the principle new garden forms of *Astilbe Arendsi* are given, especially Gloria, which has a compact growth and dark red flowers. Opal is a strong grower with light violet flowers; Gunther, very high, pure pink flowers; Diamant and Bergkristall, pure white flowers; Amethyst, very strong growth with deep violet flowers; Grenat, like Amethyst, but the flowers dark carmine red.—*J. C. Th. Uphof.*

4170. ZÖRNITZ, H. **Die dankbarsten Schnittstauden vom März bis Oktober. [The best perennials for cut flowers from March to October.]** Gartenwelt **25:** 34–38. 1921.

VEGETABLE CULTURE

4171. BOUQUET, A. G. B. **Vegetable gardening in Oregon.** Oregon Agric. Exp. Sta. Circ. 23. *43 p., 12 fig.* 1922—Among the topics discussed are: vegetable production for the local market, community production of truck crops, vegetables for canneries and dehydrators, greenhouse vegetables, horticultural varieties of vegetables, seed and seed strains, growing young vegetable plants, profitable use of frames, soil treatment for diseases, soils for vegetables, fertilizers, irrigation, insect pests and their control. One of the tables gives cultural directions for miscellaneous vegetables.—*C. E. Owens.*

4172. Brüning, Aug. **Betrachtungen über Gemüsebau mit einem Bericht über vergleichende Sortenanbauversuche im Palmgarten, Leipzig.** [Considerations on vegetable growing with a report of comparative variety trials in the Palmgarten, Leipzig.] Gartenwelt **24:** 155–159. 1920.—Variety trials of beans, cucumbers, cauliflowers, red and white cabbage, kohlrabi, carrots, red beets, and radishes are reported.—*J. C. Th. Uphof.*

4173. Buchholtz, F. A. **Wärmekontrolle in Gewächshäuser.** [Heat control in greenhouses.] Gartenwelt **24:** 9–10. 1920.—Electric warning thermometers are of great advantage in hothouses where expensive and delicate plants are being grown. The grower is warned when a certain low temperature is approached.—*J. C. Th. Uphof.*

4174. Ferris, E. B., and F. B. Richardson. **The sweet potato for south Mississippi.** Mississippi Agric. Exp. Sta. Bull. 206. *20 p.* 1921.—This bulletin contains a discussion of the requirements of the crop, its adaptation to south Mississippi soils; results of fertilizer and variety tests, recommendations for seed selection, culture, storage, and marketing; and discussions of the diseases of and insects infesting the sweet potato.—*J. Fred O'Kelly.*

4175. Hartwell, Burt L. **Commercial fertilizer, manure and lime in the growing of truck crops.** Rept. Maryland Agric. Soc. **6:** 327–334. 1921 [1922].—This is a discussion of experiments conducted at the Rhode Island Experiment Station.—*H. A. Jones.*

4176. Heins, H. **Betrachtungen über den Gemüsebau am Rhein.** [Considerations on vegetable growing along the Rhine.] Gartenwelt **24:** 208–209. 1920.

4177. Jones, Henry A. **Tomatoes for market and canning.** Maryland Agric. Exp. Sta. Bull. 248. *153–187.* 1922.—Early tomato plants (variety Bonny Best) raised in 4-inch pots, in greenhouse bench, in flats, and outdoor seed bed, gave yields of 497.2, 502.4, 487.4, and 318.1 bushels per acre respectively. The greatest financial returns came from tomatoes yielding the earliest fruit. For the production of canning house tomatoes, starting plants early in hot beds is recommended. Experiments show that early-started plants have out-yielded the late "seed-bed"-started plants in almost every case. Cost of producing a ton of canning house tomatoes in Maryland in 1919 varied from $14.96 to $130.00. The greater the yield per acre, the less the cost of production per ton.—*H. A. Jones.*

4178. Lipscomb, J. N., and M. E. Andrews. **The cost of producing truck in Copiah County, 1921.** Mississippi Agric. Exp. Sta. Circ. 39. *4 p.* 1921.

4179. Pelton, W. C. **Possible cause for variation in yield of check plots in a fertilizer experiment with vegetables.** Proc. Amer. Soc. Hort. Sci. **18:** 227–233. 1921 [1922].—Studies were made to determine the causes for variation in yield between check plots. Variations were found in depth of surface soil and in organic content of both surface and subsoil. Variation in subsoil was greater than in surface soil, there being differences between plots in depth to bed rock, compactness, color, etc. The variation found in soil acidity is thought to be the most important factor in accounting for difference in crop yields. According to the Jones test as modified by White, the lime requirement varied from 1000 to 4,565 pounds of calcium oxide per acre.—*H. A. Jones.*

4180. Radebaugh, A. D. **Tomato growing.** Rept. Maryland Agric. Soc. **6:** 335–341. 1921 [1922].—This is a discussion of improved methods for growing of canning house tomatoes, with some cost-of-production studies.—*H. A. Jones.*

4181. Read, F. W. **Growing and shipping California lettuce.** Monthly Bull. California Dept. Agric. **10**: 3–12. *Fig. 1–4.* 1922.—There are 3 distinct lettuce sections in California producing high grade lettuce for shipment. These are so outlined that they furnish lettuce throughout the year, the bulk of the crop being harvested in February, March, and April. The author gives a description of methods of cultivation, packing, and shipping for eastern markets. In a short period of years the lettuce industry of California has grown to an annual production of about 8,000 cars. Climatic and other environmental conditions indicate a promising lettuce industry in California.—*E. L. Overholser.*

4182. Weirup. **Anbauversuche mit Erbsen.** [Culture experiments with peas.] Mitteil. Deutsch. Landw. Ges. **37**: 25. 1922.—An experiment at 4 stations to determine the most economical spacing for garden peas is reported.—*A. J. Pieters.*

4183. Weishaar, L. J. **Testing the carrying qualities of California cantaloupes.** Monthly Bull. California Dept. Agric. **10**: 314–316. 1921.—Cantaloupes at different stages of maturity were picked and shipped to eastern markets, temperature observations being made in transit. It was found that the cantaloupes were being shipped too green and did not ripen upon their arrival.—*E. L. Overholser.*

4184. Weishaar, L. J., and S. S. Rogers. **The growing and shipping of California cauliflower and broccoli.** Monthly Bull. California Dept. Agric. **11**: 372–376. 1922.—California cauliflower is harvested the year round, the periods for different sections following each other in succession. The bulk is harvested November–March, 80 per cent of the total production of cauliflower in the U. S. A. being in California. The 2nd state in production is New York. The product is carefully graded and packed, and a certificate is issued by an inspector describing the quality and condition. Varieties, cultural methods, and diseases are given.—*E. L. Overholser.*

HORTICULTURAL PRODUCTS

4185. Condit, I. J. **Suggestions for drying of figs.** Associated Grower 2^8: 32–33. 1921.—Figs are allowed to drop to the ground before being gathered for drying; they should never be pulled. They are usually washed, put on trays, and dried in the sun 2–3 days. Not all varieties need to be sulphured, *e.g.*, the Mission,—which is black. Sulphuring produces a light-color and soft skin and has good disinfectant values. Sulphur rooms should be air tight. One quart of sulphur is usually required to sulphur 100 trays of figs.—*E. L. Overholser.*

4186. Cruess, W. V., and Lal Singh. **Marmalade juice and jelly juice from citrus fruits** Univ. California Agric. Exp. Sta. Circ. 243. *8 p.* 1922.—The writers believe that canned marmalade juice and, to a less degree, canned citrus jelly juice possess sufficient merit to make their commercial production worthy of serious consideration by canners and manufacturers of citrus by-products. Their production should afford a profitable means of utilizing fruit-canning equipment during the winter and spring months.—*A. R. C. Haas.*

4187. Mach, F., und M. Fischler. **Die Zusammensetzung der Moste des Jahres 1920 in Baden.** [Composition of the must of 1920 in Baden.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel **42**: 35–40. 1921.—Analytical tables and comments are given.—*E. E. Stanford.*

4188. Powers, Ray. **Prune drying in Oregon.** Monthly Bull. California Dept. Agric. **10**: 316–323. *Fig. 51–54.* 1921.—Prune drying in Oregon is discussed with reference to varieties, difficulties encountered in drying, types of evaporators used, and temperatures and humidities employed. A brief discussion of the cost of evaporation is included.—*E. L. Overholser.*

4189. Schmitt, Richard, **Die 1920-er Traubenmoste Frankens.** [French musts of 1920.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel **42**: 105–106. 1921.

4190. Stern, J. **Moste des Jahres 1920 aus den Weinbaugebieten der Nahe, des Glans, des Rheintals unterhalb des Rheingaues, des Rheingaues, des Rheins, des Mains, und der Lahn.** [Musts of 1920 from the wine-regions of Nahe, Glans, the Rhine valley below Rheingau, Rheingau, the Rhine, Mains, and Lahn.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel **42**: 32–34. 1921.—Analytical results are tabulated, with comments.—*E. E. Stanford.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. Sinnott, *Editor*

(See also in this issue Entries 3286, 3302, 3426, 3463, 3471, 3476, 3486, 3489, 3564, 3611, 3625, 3633, 3641, 3817, 3831, 3863, 3980, 3996, 4074, 4283, 4287, 4299, 4461, 4476, 4501, 4553, 4565, 4566, 4611, 4612, 4613, 4679, 4686, 4691, 4692, 4796, 4887)

4191. Anonymous. **Note on Araucaria imbricata.** Nature **109**: 87. 1922.—Cases are reported of the production of viable seed by plants of this species in England; and of the "bleeding to death" of a plant through scars caused by the breaking away of branches. Large quantities of resin set in hard, amber-like masses were found in the roots of this plant.—*O. A. Stevens.*

4192. Anderson, Flora. **The development of the flower and embryogeny of Martynia louisiana.** Bull. Torrey Bot. Club **49**: 141–157. *Pl. 7–8, fig. 1–25.* 1922.—The flowers develop in the axils of protective bracts; only 1 megaspore functions, the embryo-sac is long and narrow with enlarged micropylar end; the 3 antipodals persist as "elaborators of food." Fertilization takes place from 6 to 8 hours after pollination, but the pollen-tube persists long after endosperm is formed. Endosperm formation and suspensor activity are described; embryo development is as in *Capsella.*—*P. A. Munz.*

4193. Arber, Agnes. **Studies on intrafascicular cambium in monocotyledons V.** Ann. Botany **36**: 251–256. *8 fig.* 1922.—Additional examples are cited, both from recent literature and from the author's own work, of intrafascicular cambium in monocotyledons. Even among the Helobieae, with their poorly developed vascular bundles, cambial activity has been found in the Alismaceae, Aponogetonaceae, and Hydrocharitaceae. A cambium has now been observed in 22 monocotyledonous families.—*W. P. Thompson.*

4194. Arisz, W. H. **De structuur van het melksapvaatstelsel bij Hevea.** [The structure of the laticiferous vessel system of Hevea.] Arch. Rubbercult. **3**: 139–153. 1919.—The author finds communications between the different concentric layers of latex vessels. Former investigators could not find these because they did not study sections of sufficient length. These communications make it possible for latex, obtained from a cut at the base of the trunk, to have come from the trunk, the main root, or the main branches. It cannot have come from the leaves or from secondary or tertiary branches, since there are no channels of communication to these parts.—*Carl D. La Rue.*

4195. Beausieux, R. **Observations anatomiques et physiologiques sur le Crinum capense Herb.** [Anatomical and physiological observations on Crinum capense.] Mem. Soc. Roy. Sci. Liége **11**: 41 p. *46 fig.* 1921; also Arch. Inst. Bot. Univ. Liége **5**: 1914 [1920].—The author studied the anatomy of the ovary, fruit, and embryo in the seed and seedling, and performed experiments on the reproductive organs. The arrangement of the floral structures allows direct pollination by the action of the wind on the peduncles. After incomplete pollination, the seed, being less numerous than usual, have an abnormally great development. They germinate without undergoing a latent period. The cotyledons elongate before the root does by intercalary growth in their lower portions, which display positive geotropism. The stomata perform the role of absorbing organs. Liquid occurs in some of the intercellular spaces.—*Henri Micheels.*

4196. Benedict, H. M. **Further consideration of the size of vein-islets of leaves as an age-determinant.** Science 55: 399–400. 1922.—Replying to the criticism of Ensign [see Bot. Absts. 11, Entry 1951] that the use of fresh leaves under low magnification is not accurate as a method of determining the size of vein-islets in leaves, the author points out the advantages of the method criticised in that it gives a useful "morphological summation" and is adapted to field use. Experience will enable the observer to eliminate differences not due to age.—*E. W. Sinnott.*

4197. Bobilioff, W. **De inwendige bouw der schorselementen van Hevea brasiliensis. [The internal structure of the bark elements of Hevea brasiliensis.]** Arch. Rubbercult. 3: 222–230. 1919.—The bark is made up of cork, cork-cambium, phelloderm, stone cells, parenchymatous cells, medullary rays, laticiferous vessels, and sieve tubes. The laticiferous vessels contain protoplasm and nuclei. The author assumes that the latex is cell-sap occurring in the vacuoles of the laticiferous vessels. The nuclei may move about in the latex vessels and even pass from one vessel to another through the openings in the walls.—*Carl D. La Rue.*

4198. Bois, D. **Présentation d'échantillons de maïs attaqué par le charbon du maïs et à inflorescences androgynes. [Samples of Zea Mays smutted by Ustilago Maydis showing stamino-pistillate inflorescences.]** Bull. Soc. Path. Vég. France 8: 139. 1920.

4199. Chauveaud, G. **La constitution des plantes vasculaires révélée par leur ontogenie. [The constitution of vascular plants as revealed by their ontogenie.]** *xiv + 156 p.* Payot et Cie: Paris, 1921.

4200. Dauphine, André. **Production expérimentale de l'accélération dans l'évolution de l'appareil conducteur. [Experiments in inducing an acceleration of the development of the vascular system.]** Compt. Rend. Acad. Sci. Paris 173: 1111–1113. *Fig. 1–3.* 1922.—The differentiation of the vascular system in the axes of phanerogams normally proceeds through the 3 stages of "alternate," "intermediate," and "superposed" bundles (terminology of Chauveaud). The author was able to accelerate development experimentally. In a young root of lupine he cut off the meristematic region and found that the superposed condition was organized directly without the other phases preceding it.—*C. H. Farr.*

4201. Ernould, Maria. **Recherches anatomiques et physiologiques sur les racines respiratoires. [Anatomical and physiological researches on respiratory roots.]** Mem. Acad. Roy. Belgique, Cl. Sci. 2ᵉ Ser. 5: 52 p. *23 fig.* 1921.—Anatomical studies were made on *Bruguiera gymnorhiza, Avicennia officinalis, Sonneratia acida, Metroxylon,* and *Raphia Laurenti.* They show that all the roots or portions of roots raised above the mud in the mangroves and other plants growing on inundated tropical shores display certain characters in common: cortical parenchyma with large and numerous intercellular spaces sometimes growing into large radial clefts; communication between the interior of the cortex and the outside air either by lenticels, exfoliation of the corky layer, or pneumatodes; presence in the cortical parenchyma of thick-walled elements which keep open the air passages; peripheral vascular bundles in the stele; cork and epidermis strongly cuticularized.—Their physiological anatomy shows that the vertically-growing roots and knee-roots are respiratory organs. They are evidently, as in *Sonneratia,* negatively geotropic. Their presence is an adaptation to an environment deficient in air.—*Henri Micheels.*

4202. Ewald, Elisabeth. **Beiträge zur Kenntnis der sogenanten "Schwimmhölzer." [Contribution to a knowledge of the so-called "swimming woods."]** Flora 114: 394–400. 1921.—A study of the origin and physiological anatomy of the tissues of the light-wooded species *Herminiera Elaphroxylon, Aeschynomene indica, A.* sp. *Erythrina crista-galli, E. indica, E. palustris, E.* sp., *Pterocarpus Draco, Nyssa sylvatica, Cavanillesia* sp., and *Bariguda* spp., and possibly of a number of other species of *Aeschynomene,* of *Geissapis cristata, G. tenella,* and *Soemmeringia semperflorens* (reported by earlier investigations) shows them to have the following features in common: light, thin-walled, wide-lumened tissue, slight lignification, no cell contents, large and abundant pits with thin membranes, and (except in *Cavanillesia* and *Bariguda*, which are exceptions in that they grow in dry habitats) poorly developed intercellular spaces. The characteristic tissue of these woods is aerenchyma, with the above-mentioned exceptions. Experiments were made in forcing air and suspensions in liquid through these woods Attempts to plug the vessels were unsuccessful. Greater pressure was necessary to force air through wood of *Taxus* than through that of broad-leaved trees. A suspension of Berlin blue and one of colloidal arsenious sulphide precipitated with hydrochloric acid were used. These entered only open cells and did not pass from cell to cell. The term "swimming woods" as applied to those characterized by the presence of aerenchyma is deplored as misleading.—*Eloise Gerry.*

4203. FRITSCHÉ, E. **Recherches anatomiques sur le Corydalis solida Sm. [Anatomical researches on Corydalis solida.]** Arch. Inst. Bot. Univ. Liége 5: 17–34. *5 pl.* 1914 [1920].—A study of the structure of tubercles is reported.—*Henri Micheels.*

4204. FRITSCHÉ, E. **Recherches anatomiques sur le Taraxacum vulgare Schrk. [Anatomical researches on Taraxacum vulgare.]** Mem. Soc. Roy. Sci. Liége 11: *25 p. 30 fig.* 1921; also Arch. Inst. Bot. Univ. Liége 5: 1914 [1920].—The author studied the external characters and the anatomy of the plant in its first 2 flowering seasons, then at several years of age, and finally when very old. Observations were made on the elongation of the stems, on adventitious structures, and on the healing of wounds. The necrosis which follows the disappearance of the flower stalks results in the development of an adventitious cambium which closes the wounds caused by decapitation, mutilation, or longitudinal tearing. It is not possible to determine the exact age of the plant either by its internal structure or its external characters.—*Henri Micheels.*

4205. GOEBEL, K. **Organographie der Pflanzen. Dritter Teil: Spezielle Organographie der Samenpflanzen. Erstes Heft: Vegetationsorgane. [Organography of plants. Part III: Special organography of the seed plants. Vol. I: Vegetative organs.]** *2nd ed., 283 p., 220 fig.* Gustav Fischer: Jena, 1922.—A continuation of the 2nd edition of the "Organography," the 1st volume of which appeared in 1913. Like the others, this volume is much revised and enlarged.—*E. W. Sinnott.*

4206. GRAVIS, A. **Contribution à l'anatomie des Commélinées. [Contribution to the anatomy of the Commelinaceae.]** Arch. Inst. Bot. Univ. Liége 5: 1–9. *5 fig.* 1914 [1920].—In all the Commelinaceae studied the foliar trace was found to be star-shaped. Successive traces cross each other. This structure is in contrast with that which occurs in other many-bundled stems of monocotyledons and dicotyledons. As examples may be cited the circular and concentric foliar traces of *Chlorophytum elatum* and the zig-zag and juxtaposed ones of *Amaranthus caudatus.*—*Henri Micheels.*

4207. HEUSSER, C. **Over de voortplantingsorganen van Hevea brasiliensis Mul. Arg. [The reproductive organs of Hevea brasiliensis.]** Arch. Rubbercult. 3: 456–514. *14 pl.* 1919.—Hevea normally blossoms after the wintering season is over and the new leaves are being developed. Under favorable conditions the tree produces flowers and fruit at 3 years of age. It is monoecious and is pollinated by insects. The mature staminate flowers last about 2 days, but the pistillate flowers are capable of pollination for 3 or 4 days. The pollen is very susceptible to damage by rain. Self-fertilization rarely if ever succeeds. The mature embryo-sac has 8 nuclei. The vegetative cells have 16 chromosomes. A normal double fertilization takes place.—*Carl D. La Rue.*

4208. HIRMER, MAX. **Beiträge zur Morphologie und Entwickelungsgeschichte der Blätter einiger Palmen und Cyclanthaceen. [Morphology and development of the leaves of certain palms and Cyclanthaceae.]** Flora 113: 178–198. *10 fig.* 1919.—The author finds in his examples of palms with compound leaves that the leaf lamina is at first simple in the bud; later it becomes folded. The dividing of the leaf into separate pinnae is accomplished by the dissolution of tissues in the underside of the fold, and not by the splitting of the embryonic initial as Mohl and Naumann thought. A secondary epidermis is formed.—*A. M. Starr.*

4209. Hirmer, Max. **Beiträge zur Organographie der Orchidenblüte. [Organography of the orchid flower.]** Flora 113: 213–310. *Pl. 10–12, 225 fig.* 1920.—A detailed study of 80 genera of orchids with reference to the relation between rostellum and anther is reported. As a result the author suggests a classification which in its main lines is a return to that of Bentham and Hooker. Excluding the Vanillinae, in which the rostellum is not developed, the monandrous orchids are placed in 3 groups. In the 1st, which corresponds in general to the Epidendreae of older authors, the glandulae consist of loose flocculent particles which are detached separately from the rostellum; in the 2nd the glandula is detached from the rostellum in 1 mass together with a portion of unmodified epidermis; in the 3rd, the Vandeae of older authors, the glandula is also detached as a whole but it is further characterized by the development of the stipe (not caudicula) consisting of the glandula and the stipe plate, which is formed by a portion of modified epidermis of the rostellum. There are 3 types of development of the pollinium, following in the main the lines of the 3 groups. In the 1st there is a splitting up of the pollinium into several parts by the formation of caudiculae which are strands produced by the sterilization of sporogenous tissue; in the 2nd the upper part of the pollinium has a pointed end which is marked by the development of a more or less elongated and sticky tapetum which attaches the pollinium to the glandula; in the 3rd there occurs in connection with the formation of the complicated apparatus of the stipe an extensive development of the tapetum which forms a sticky envelop for the pollinium and at the same time there is usually the union of the sporogenous tissue of 1 theca into a double pollinium.—*A. G. Stokey.*

4210. Holm, T. **Dirca palustris L., a morphological study.** Amer. Jour. Sci. 2: 177–182. *7 fig.* 1921.—The internal structure of the root and stem of this species is described. As it is an inhabitant of damp, rich woods its structure is considered anomalous because of the abundance of mechanical tissue, which renders the bark of the root and stem tough. Also the stomata are confined to the lower surface of the leaf and sunk below the epidermis. The author concludes that the anatomical structures of this species are not in correlation with its environment but that they may be explained as inherited characters.—*T. J. Fitzpatrick.*

4211. Jackson, Violet G. **Anatomical structure of the roots of barley.** Ann. Botany 36: 21–40. *12 fig.* 1922.—A barley plant when 6–8 weeks old shows 2 distinct kinds of roots: (1) a thin, much branched type with single axile duct, 6–8 xylem groups, thick-walled stelar tissues, and root hairs at the tip only; and (2) a thick, unbranched type, with 4–6 ducts, 12–16 xylem groups, thin-walled stelar tissues, and root hairs abundant throughout. These differences are probably all associated with the fact that the chief function of the unbranched roots is to provide a plentiful supply of water during the time of vigorous growth.—*W. P. Thompson.*

4212. Jivanna Rao, P. S. **Proliferation in Opuntia dillenii.** Jour. Indian Bot. 2: 321. 1921.—The author found a young fruit bearing 2 smaller fruits.—*Winfield Dudgeon.*

4213. Lo Priore, G. **Germinazione dei semi tricotili. [The germination of tricotyledonous seed.]** Staz. Sper. Agrarie Ital. 54: 227–247. 1921.—A study of the germination of tricotyledonous seed in the medlar is reported. The biology of the root and shoot, physiological polyembryony, shoot formation from portions of the cotyledon, discoloration with advance in development, phyllotaxy, cotyledonary scars, hemitricotyly and heterocotyly are considered.—*A. Bonazzi.*

4214. McWhorter, Frank P. **Note on "Effect on banana fruit of premature appearance of the inflorescence."** [Rev. of: Mendiola, N. B. Effect on banana of premature appearance of the inflorescence. Philippine Agric. **10**: 299–300. 1922 (see following entry).] Philippine Agric. **10**: 441. 1922.—Exposure to light is regarded as responsible for the abnormally short internodes and close-set fruits in bananas that developed from a prematurely-exposed inflorescence.—*Sam F. Trelease.*

4215. Mendiola, Nemesio B. **Effect on banana fruit of premature appearance of the inflorescence.** Philippine Agric. **10**: 299–300. *1 pl.* 1922.—Storm injury resulted in premature appearance of the inflorescence. The fruits produced were undersized and thickly set, but otherwise normal. [See also preceding entry.]—*Sam F. Trelease.*

4216. Obaton, Fernand. **Structure comparée des feuilles de même age et de dimensions differentes.** [A comparison of the structure of leaves of the same age which differ in size.] Compt. Rend. Acad. Sci. Paris **173**: 1113–1116. 1922.—Six species of woody plants were studied, the structure of large leaves being compared with that of smaller ones of equal or greater age. Smaller leaves were found to have fewer main veins and to be more symmetrical in outline, the basal lobes being more nearly equal and the apex more obtuse. The inter-veinal areas are found to have the same thickness and the same internal structure in both. The tissues of the vein at the base of a large leaf are more extensive than at a corresponding place in a small leaf, but veins which supply an equal area of leaf tissue in the 2 leaves are practically the same in structure. The petioles of small leaves frequently have fewer bundles than those of large leaves. In classification, therefore, the structure of leaves of normal size should alone be considered.—*C. H. Farr.*

4217. Piper, C. V. **An unusual type of proliferation in Agropyron cristatum.** Jour. Heredity **12**: 423. *1 pl.* 1921—Abnormal spikes and spikelets of *Agropyron cristatum* are described. Some of the spikelets are replaced by leafy shoots; others have the rachilla much elongated and the lower lemmas enlarged. In both types, however, the glumes are unchanged.—*Mary R. Burr.*

4218. Poulton, Ethel M. **An unusual plant of Cheiranthus cheiri L.** New Phytol. **20**: 242–245. *Fig. 1–12.* 1921.—The 6 stamens of the normal flower are replaced by 6 ovulate carpels, which often fuse with the central gynoecium.—*I. F. Lewis.*

4219. Reiche, Karl. **Beiträge zur Kenntnis der Gattung Fouquiera.** [Contributions to a knowledge of the genus Fouquiera.] Bot. Jahrb. **57**: 287–301. *Fig. 1–8.* 1921.—Morphological and biological notes on *F. formosa* HBK. in Mexico are presented. The vegetative and reproductive organs, systematic position, geography, ecology, and biology are discussed. The leading and axillary shoots, the peculiar endogenous appearance of the lateral shoots due to their buried apices, the inflorescence and its position, as well as the arrangement of calyx and corolla in the bud are described. The leaves are not strongly dorsiventral in structure. The androecium is peculiar in several ways. The stamens are in 1 series, their length varies irregularly, and they are not related in number and position to the form of the corolla. The stamens and corolla are inserted at the same height. The ovary is without disc or nectary of any kind. The fruit and seed are described. This species is a xerophyte. Its showy red flowers are ornithophilous, but since there are no nectaries it must be insects that the birds seek. The author discusses the systematic position of the Fouquieriaceae, noting the many divergent views. It is believed that the family are primitive Sympetalae, showing some relation to the Parietales.—*K. M. Wiegand.*

4220. Roelants, H. W. M. **Über das mechanische System in den Stengeln der Gramineen.** [The system of mechanical tissue in the stems of the Gramineae.] Recueil Trav. Bot. Neerland. **18**: 322–332. 1921.—About 100 species of grasses were studied. The author distinguishes 4 main types of arrangement of mechanical tissue: (1) A subcortical ring, separated from the epidermis by layers of parenchyma cells. (2) A subepidermal ring, directly adjacent to the epidermis. Some vascular bundles are within this ring and others at its inner edge. (3) Subepidermal ribs, each usually in part surrounding a vascular bundle. In sub-type (a), ribs are opposite all vascular bundles; in (b) opposite only some of them. (4) The subcortical ring is strengthened by subepidermal ribs, the author distinguishing 4 sub-types with reference to the manner in which these ribs are related to the bundles. Examples of all these types and sub-types are given.—*J. C. Th. Uphof.*

4221. Rogers, R. S. **Notes on the gynostemium in the genus Diuris, and on the pollinary mechanism in Phajus.** Trans. Roy. Soc. South Australia **45**: 264–269. *Pl. 22.* 1921.—In *Diuris* the reproductive mechanism is found to be primitive for the Orchidaceae. The pistil and stamen are separate, and the pollinia lack a caudicle. In *Prasophyllum,* style and filament are united at the base, the wings of the filament mostly attach to the stigmatic plate, and a caudicle is present. *Phajus* is self-pollinating.—*J. H. Faull.*

4222. Sabnis, T. S. **The physiological anatomy of the plants of the Indian Desert.** Jour. Indian Bot. **1**: 33–43, 65–83, 97–113, 183–205, 237–247, 277–295; **2**: 1–19, 61–79, 93–115, 157–173, 217–235, 271–299. *1 map, 361 fig.* 1919–1920.—Material for this study was taken from collections from the Rajputana Desert. The area is dry and undulating, with much moving sand. Rainfall averages 10–13 inches, most of which falls during July–September. The temperature may drop to about the freezing point in winter, while the heat of May and June is scorching. The author describes the specific structural characters of leaf and stem in 165 representative species. "The specific characters that are considered are just those that will be useful in the diagnosis of species." In leaves, the cells of the upper epidermis are larger than those of the lower, and leaf epidermal cells are larger than those of the stem. The walls of the epidermal cells are variously thickened, sculptured, and waterproofed, and some plants have a 2-layered epidermis. Stomata commonly occur on both leaf surfaces. The chlorenchyma presents a wide range of variation, and apparently shows an evolutionary sequence from homogeneous polygonal cells to well marked palisade tissue. The latter arrangement reduces intercellular spaces to a minimum, and thus decreases transpiration. Leaf veins usually are prominent on the abaxial side of the leaf, and are surrounded by sheaths. Hairy coverings are characteristic of all forms except succulents. The intense light in the desert arrests the development of parenchyma, which in turn causes increased hairiness. Glandular hairs are not very common. Water storage tissue may be found in almost any part of the plant. Tannins and calcium oxalate are of frequent occurrence. The cells of the pericycle usually are thickened in some way, as the result of water deficiency. Vessels in the wood are small both in number and diameter. A few species show anomalous vascular structure. The taxonomic value of various structural differences is noted. [See also Bot. Absts. 5, Entry 1904; 6, Entry 771.]—*Winfield Dudgeon.*

4223. Sandt, Walter. **Beiträge zur Kenntnis der Begoniaceen. [Contributions to a knowledge of the Begoniaceae.]** Flora **114**: 329–384. *14 fig.* 1921.—All species of *Begonia,* both erect and climbing, have a dorsiventrality which is due primarily to internal organization but which is influenced by external factors. The seed development is similar to that of the Datiscaceae, both showing the peculiarity that at germination a sharply outlined cap of the testa is pushed off by the root. Self-pollination occurs in some forms; insect visitors were noted in other cases. A study was made of double flowers, flower abnormalities in hybrids, and in particular of anther hypertrophy in *B. Scharfii.* The author regards the Datiscaceae as the only closely related family.—*A. G. Stokey.*

4224. Saunders, Edith R. **The leaf-skin theory of the stem; a consideration of certain anatomico-physiological relations in the spermatophyte shoot.** Ann. Botany **36**: 135–166. *34 fig.* 1922.—Evidence is presented from many species to show that the surface tissue of the axis of the shoot is of foliar origin. It is believed that the leaves are decurrent not only in those cases in which they appear to be so, but generally throughout spermatophytes and in some at least of the pteridophytes. A leaf-skin, fused with the axis, is formed by the downward growth and extension of the leaf-base. The edges of these extensions are indicated in many cases by ridges, furrows, lines of hairs or of color. In other cases no outward trace of them is visible. In the same way the superficial tissues of the hypocotyl are derived from the cotyledons. The surface pattern of these extensions depends on the arrangement of the leaves and the width of their insertion. Many patterns are worked out and actual examples described.—*W. P. Thompson.*

4225. Sprecher, A. **Contribution à l'étude des poils de la fleur et du fruit d'Eriodendron anfractuosum DC. [Contribution to the study of floral and fruit hairs of Eriodendron anfractuosum.]** Rev. Gén. Bot. 34: 81–95, 156–165. 1922.—Three types of hair were found. The first to appear are the fibrous hairs, which are found on the exterior epidermis of the petals, occur in pairs, are lignified, reach a length of 1.5–2.0 mm. and a diameter of 120μ, have a wall ¼–½ the cell diameter in thickness, and serve to protect the petals and other floral parts from premature dessication. The glandular hairs appear between the fibrous ones, are multicellular, rich in protoplasm, born singly, 200–250μ in length, and probably serve to secrete water. The same types of hair occur on the calyx as on the corolla, but only on its interior surface and the glandular hairs only on the lower half. A 3rd type of hair develops in the interior of the ovary and elongates rapidly as the fruit matures, reaching 4 mm. in length. The nucleo-cytoplasmic ratio in these hairs is discussed. The structure of the internal stomata of the ovary is described.—*J. C. Gilman.*

4226. Tukey, Harold B. **A case of pistillody and staminody in the plum.** Torreya **22**: 28–29. 1922.—Studies of a cultivated plum, probably a hybrid of *Prunus triflora*, showed a partial replacement of stamens by pistils and of petals by stamens, instead of the usual uniform and entire replacement of one whorl by another.—*J. C. Nelson.*

4227. Wilson, Carl L. **Lignification of mature phloem in herbaceous types.** Amer. Jour. Bot. **9**: 239–244. *1 pl.* 1922.—The phloem of a considerable number of herbaceous angiosperms was studied, but no evidence of lignification was found in this tissue except among several genera of the series Tubiflorae of the Compositae. Here there was extreme lignification of the phloem parenchyma but of no other cells. Within the same genus, some species show lignification and others do not. Lignified elements were frequently found in the root as well as in the stem. A list of the 185 species studied is given.—*E. W. Sinnott.*

4228. Wisselingh, C. van. **Bijdragen tot de kennis van de zaadhuid. Dertiende bijdrage. Over de zaadhuid der Rosaceen. [Contribution to a knowledge of the seed-coat. 13. The seed-coat of the Rosaceae.]** Pharm. Weekbl. 59: 1–18. *Pl. 1, fig. 11.* 1922.—The ovule of the Rosaceae is anatropic and provided with 1 (Rosoideae) or 2 (Pomoideae and Prunoideae) integuments. The character of these integuments, particularly with reference to the degree and distribution of cutinization, is described in detail.—*H. Engelhardt.*

4229. Young, W. J. **Potato ovules with two embryo sacs.** Amer. Jour. Bot. **9**: 213–214. *1 fig.* 1922.—Several instances are recorded of the occurrence of more than 1 embryo sac in potato ovules.—*E. W. Sinnott.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. Transeau, *Editor*
L. H. Tiffany, *Assistant Editor*

(See in this issue Entries 3409, 3491, 3494, 3500, 3502, 3503, 3506, 3507, 3528, 3575, 4485, 4486, 4622, 4685, 4788)

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 3409, 3462, 3508, 3535, 3592, 3881, 4254, 4270, 4788)

4230. ANONYMOUS. Miscellaneous notes. Bryologist 25: 60. 1922.—A notice is given regarding the possible issue of a set of Venezuelan mosses collected by H. Pittier.—*E. B. Chamberlain.*

4231. AMANN, J. Bryum turgescens Hagen et le no. 397 des Musci europaei de Bauer. [Bryum turgescens and No. 397 of Bauer's Musci europaei.] Rev. Bryologique 48: 59–60. 1921.—The author points out that Limpricht considered the Norwegian *Bryum turgescens* Hagen [usually written *B.* "*turgens*"] a synonym of *Cinclidium hymenophyllum* (Br. eur.) Lindb., while Roth referred it as a variety to *B. neodamense* Itzigs. Without settling this disputed point he shows that the specimens distributed in Bauer's Musci europaei under No. 397 differ in many important respects from Hagen's original description. In his opinion these specimens, which were collected in Norway by Bryhn, do represent a form of *B. neodamense.*—A. W. Evans.

4232. BENEDICT, CHARLOTTE. Vegetative Sprossbildung an den Archegonständen von Fimbriaria Zollingeri St. [The formation of vegetative shoots on the archegoniophores of Fimbriaria Zollingeri.] Bot. Jahrb. 56: 415–428. *7 fig.* 1921.—The Fimbriaria studied was found in the moss house of the Berlin-Dahlem Botanical Garden and identified as *F. Zollingeri* St. of Java and Sumatra. During the summer the thalli grew vigorously and produced an abundance of archegoniophores; during the fall the thalli became discolored and less vigorous, but the formation of archegoniophores continued with but little if any decrease. In the winter small thalli with rhizoids and ventral scales grew out from the under side of some of the receptacles; these frequently produced tertiary thalli and, in a few cases, new archegoniophores with stalks only a few mm. in length. The archegoniophores that gave rise to secondary thalli were in part sterile, and those borne on the secondary thalli invariably so. The paper describes various individual cases in great detail and calls attention to the fact that vegetative shoots and gemmae cups have been found by different workers on the antheridiophores of other Marchantiaceae.—*K. M. Wiegand.*

4233. DISMIER, G. Observations sur le Didymodon cordatus Jur. [Notes on Didymodon cordatus.] Rev. Bryologique 48: 52, 53. 1921.—In discussing *Didymodon cordatus* the author refers to its original discovery in France by Dixon and Nicholson and adds several new stations based on his own collections. He describes the distinctive features of the plant, emphasizing those drawn from the gemmae. As a result of his studies he concludes that *D. cordatus* is a subspecies of *D. rigidulus* Hedw. and not of *D. luridus* Hornsch., as certain authors have supposed.—*A. W. Evans.*

4234. EVANS, ALEXANDER W. Notes on North American Hepaticae—IX. Bryologist 25: 25–33. *Pl. 1.* 1922.—In the introductory paragraph the author corrects reports made in earlier papers of the series regarding 2 species of *Riccia* and comments on certain synonyms of *Lophozia Wenzelii* (Nees) Steph. In the body of the paper the following extensions of range are recorded: *Blasia pusilla* L. to New Mexico, *Plagiochila Smallii* to the West Indies, and *Diplophyllum gymnostomophilum* to Cape Breton and Wisconsin. In addition, *Diplophyllum Andrewsii*, discovered in North Carolina and Tennessee by A. L. Andrews, is proposed as new, figured, and discussed at length; the occurrence of *Gymnomitrium varians* (Lindb.) Schiffn. in British Columbia is confirmed, and its distinctive characters are discussed; the perichaetial bracts and perianths of *Ptychocoleus heterophyllus* Evans are described and figured for the first time (from Nicaraguan material); and the following species are reduced to synonymy: *Jungermannia Peckii* Aust., which becomes a synonym of *Harpanthus scutatus* (Web. & Mohr) Spruce; *Jungermannia Rauana* Steph., a synonym of *Jamesoniella autumnalis* (DC.) Steph.; *Calypogeia acuta* Steph., a synonym of *C. Trichomanis* (L.) Corda; and *Taxilejeunea erosifolia* Steph., a synonym of *T. obtusangula* (Spruce) Evans.—*E. B. Chamberlain.*

4235. Fleischer, M. [Rev. of: Krause, Ernst H. L. **Rostocker Moosflora: Verzeichnis der bis 1920 aus Nordostecke Mecklenburgs bis Bukspitze, Warnow, Gustrow, Sülze bekannt gewordenen Moosarten. (Moss flora of Rostock: enumeration of the species of bryophytes reported up to 1920 from the northeastern corner of Mecklenburg as far as Bukspitze, Warnow, Gustrow, and Sülze.)** *8 vo., 16 p.* Rostock, 1920 (see Bot. Absts. 11, Entry 2668).] Hedwigia 63: (Beiblatt) 7. 1922.—The reviewer criticises the author for including under the generic name *Hypnum* a series of very diverse genera belonging to the Bryaceae, Mniaceae, Hypnaceae, and other families of the mosses, as these are commonly understood. He criticises him also for taking up the name *Weisia*, instead of the universally employed *Orthotrichum*, and for using the masculine ending in such names as *Mollius* and *Weberus*.—*A. W. Evans.*

4236. Grout, A. J. **Brachythecium notes.** Bryologist 25: 13, 14. 1922.—The author discusses *Brachythecium pacificum* (R. & C.) Grout, raises *B. collinum Holzingeri* Grout to specific rank under the name *B. Holzingeri* Grout, comb. nov., and proposes a new forma, *falcata*, under *B. oxycladon* (Brid.) J. & S. The 1st species must be distinguished from *B. pacificum* Jennings, a synonym of *B. asperrimum* Mitt. *B. pacificum* Grout has been confused with *B. glaciale* B. & S., *B. reflexum* (Starke) B. & S., and *B. Starkei* (Brid.) B. & S., and the characters differentiating these 4 species are here contrasted. *B. pacificum* is listed from scattered localities extending from Newfoundland to Alaska and is likewise reported from Norway; *B. glaciale* is known in America from Cape Breton only; the other 2 species are common. *B. Holzingeri* is typified by a specimen collected by A. H. Brinkman in British Columbia, while the forma *falcata* was based on Michigan material collected by G. E. Nichols. —*E. B. Chamberlain.*

4237. Holzinger, John M. **Grimmia Brandegei Aust.** Bryologist 25: 16, 17. 1922.—The study of California material, collected by G. L. Moxley in Los Angeles County, indicates that Lesquereux and James were in error when they referred *Grimmia Brandegei* Aust. to their var. *pilifera* of *G. plagiopodia* Hedw. The vegetative characters of *G. Brandegei* show that it is abundantly distinct. An earlier report of the species from Minnesota is proved to be erroneous.—*E. B. Chamberlain.*

4238. Holzinger, John M. **Miscellaneous notes.** Bryologist 25: 37. 1922.—A list is given of the 25 species of mosses distributed in fascicle 18 of the author's Musci Acrocarpi Boreali-Americani and is supplemented by a summary of the collectors and localities represented.—*E. B. Chamberlain.*

4239. Jäggli, M. **Contributo alla briologia ticinese. [Contribution to the bryology of Ticino.]** Boll. Soc. Ticinese Sci. Nat. **16**: 1–6. 1921.—An earlier article bearing this same title has already been abstracted [see Bot. Absts. 8, Entry 2036]. In the present article the author continues his observations on the bryophytes of Ticino, Switzerland, and gives a list of 60 hepatics from the canton, based on his own collections. Full data regarding stations are given, and 12 of the species included represent additions to the flora of Ticino.—*A. W. Evans.*

4240. Jäggli, M. **Le attuali conoscenze di briologia ticinese. [Our actual knowledge regarding the bryology of Ticino.]** Boll. Soc. Ticinese Sci. Nat. **15**: 96–99. 1920.—The author gives a historical review of the work done on the bryophytes of the canton of Ticino, Switzerland. The earliest collector there was apparently Schleicher, who visited the region in 1807. More extensive studies were afterwards carried on by Alberto Franzoni [see Bot. Absts. 8, Entries 1721 and 2037] and Lucio Mari, and their work has been supplemented by collections made by Röll, Kindberg, Jäggli himself, and others. At the present time 579 species of bryophytes are known from Ticino, while the entire number for Switzerland is estimated at about 870.—*A. W. Evans.*

4241. Kaiser, George B. **Little journeys into mossland. V.—The old genus Hypnum.** Bryologist 24: 58–60. 1921.—In this number of the series a popular account is given of some of the more common and easily recognized species of hypnaceous mosses. [See also Bot. Absts. 8, Entry 2259; 10, Entries 854, 2058.]—*E. B. Chamberlain.*

4242. Kaiser, George B. **Little journeys into mossland. VI.—The mosses of tree-trunks.** Bryologist 25: 14–16. 1922.—The author here gives a popular account of the more common arboreal mosses likely to be found by a beginner. [See also preceding entry.]—*E. B. Chamberlain.*

4243. Pearson, W. H. **Jungermannia stygia Hook. f. et Tayl.** Papers and Proc. Roy. Soc. Tasmania 1921: 166–167. *Pl. 23.* 1921.—The author finds that the original material of *Jungermannia stygia* from Campbell Island, a portion of which is in the Manchester Museum, is a mixture of a Gymnomitrium and a round-leaved species probably referable to the genus *Jamesoniella.* He figures both species and reproduces the Flora Antarctica figure, which was clearly drawn from the Jamesoniella. The original description, however, which was apparently based on the mixture, emphasizes the features of the Gymnomitrium, and he therefore regards this as the type of the species. In his opinion this Gymnomitrium is a synonym of the northern *G. concinnatum* (Lightf.) Corda but is amply distinct from the Tasmanian *Cesia erosa* Carringt. & Pearson, although Rodway has included the latter species also among the synonyms of *G. concinnatum.*—*J. H. Faull.*

4244. Thériot, I. **Considérations sur la flore bryologique de la Nouvelle-Calédonie et diagnoses d'espèces nouvelles.** [**Remarks on the bryological flora of New Caledonia and diagnoses of new species.**] Rev. Bryologique 48: 54–59. 1921.—The first 2 parts of this paper on the mosses of New Caledonia have already been abstracted [see Bot. Absts. 10, Entries 612, 1846]. In this 3rd and concluding part 13 species are listed and discussed with full data regarding stations. Two new varieties and the following new species are proposed, Thériot being the authority except where otherwise indicated: *Ectropothecium papillosulum, Rhacopilum Franci, Sematophyllum gracillimum, Taxithelium microcarpum, Thamnium arbusculosum* C. Müll., *Trichosteleum neo-caledonicum,* and *Warburgiella ambigua.* Collections made by I. Franc furnished material for 5 of the new species. At the end of the paper 5 species are reduced to synonymy.—*A. W. Evans.*

4245. Thériot, I. **Vandalisme et solidarité scientifique.** [**Ruthlessness and scientific brotherhood.**] Rec. Publ. Soc. Havraise Études Diverses 87: 131–135. 1920.—See Bot. Absts. 7, Entry 75.

4246. Weymouth, W. A., and L. Rodway. **Bryophyte notes.** Papers and Proc. Roy. Soc. Tasmania 1921: 173–175. 1922.—In these notes on Tasmanian mosses the authors first give a description of the imperfectly known *Ephemerum cristatum* (Hook. f. & Wils.) C. M. and show that *Trematodon flexipes* Mitt. is a true Trematodon and not a Campylopodium as Brotherus supposed. They then enumerate the following species, determined by H. N. Dixon, as new to Tasmania, each being accompanied by a brief diagnosis and a statement regarding distribution: *Dicranum trichopodum* Mitt., *Ditrichum punctulatum* Mitt., *Leucobryum brachyphyllum* Hampe, *Macromitrium Rodwayi* Dixon, *Mnium rostratum* Schrad., *Pottia Heimii* (Hedw.) B. & S., *P. melbourniana* Dixon, and *Trematodon Mackayi* (R. Br. ter.) Broth. Of these *Macromitrium Rodwayi,* collected at the entrance to Port Arthur, represents a new species, and its distinctive characters are given from Dixon's manuscript notes.—*J. H. Faull.*

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. Fitzpatrick, *Editor*
D. S. Welch, *Assistant Editor*

(See also in this issue Entries 3403, 3409, 3413, 3424, 3431, 3446, 3459, 3496, 3532, 3536, 3562, 3592, 3795, 3811, 3825, 4627, 4669, 4788, 4887, and those in the section Pathology)

FUNGI

4247. Anonymous. [Rev. of: Gwynne-Vaughan, Helen. **Fungi: Ascomycetes, Ustilaginales, Uredinales.** *xi + 232 p., 197 fig.* University Press: Cambridge, 1922 (see Bot. Absts. 11, Entry 4253).] Sci. Prog. 17: 160–161. 1922.

4248. Arnaud, G. **Étude sur les champignons parasites (Parodiellinacées, inclus Erysiphées). [A study of parasitic fungi (Parodiellinaceae, including the Erysiphaceae).]** Ann. Epiphyties 7: 1–115. *10 pl., 25 fig.* 1921.—The family Parodiellinaceae variously placed in the Pyrenomycetes is here included provisionally in the order Hypocreales. It contains 4 tribes: Bagnisiopsideae, Parodiellineae, Parodiopsideae, Erysipheae. Parasitic on higher plants and chiefly confined to leaves, the Parodiellinaceae have a superficial mycelium provided with haustoria of definite shape and frequently contain a soluble coloring matter resembling the pigments of the Hypocreales. Those of the Parodiellinaceae which possess an external mycelium (Parodiopsideae and Erysipheae) were derived during an intermediate period from the internal parasites of this group occurring in angiosperms, and these arose from the Hypocreales living on more ancient vascular plants. The Parodiopsideae and more evidently the Erysipheae have given rise to a large number of species up to the present geological period through an evolution parallel to that of the angiosperms. The fruit-bodies of the Parodiellinaceae are provided with a yellow pigment soluble in chloroform and others soluble in alcohol. All of the Parodiellinaceae are obligate parasites possessing an intramatrical apparatus. The species with external mycelium have this much reduced and the majority of the Erysipheae merely develop haustoria in the epidermal cells. The Microthyriaceae which possess an external mycelium rarely have a well developed internal one while various members of the Parodiellinaceae show transition conditions between the internal forms (*Bagnisiopsis*) and the wholly external Erysipheae. While in the Microthyriaceae and the Meliolaceae the colored hyphae form a network in one plane, a loose felt is formed in the Parodiellinaceae. The assemblage of conidial forms (Hyphomycetes) in the Parodiellinaceae may be grouped as follows: A. Conidia colored and septate; B. Conidia unicellular, hyaline. The ascogonium and the structures arising from it as well as the vegetative mycelium, fertile and vegetative stroma, and various types of fruit-bodies may show very great variation among the species of even a small group. The primitive type of the Parodiellinaceae is represented by *Bagnisiella australis* in which a thick stroma is covered above by a layer of elongated parallel asci without ascigerous cavities proper. This type corresponds to *Protothyrium salvadorae* (Cke.) Arn., primitive type of the Microthyriaceae, and to *Microthyrella Rickii* (Rehm) v. H., primitive type of the Hemisphaeriaceae. From these 3 types the Myriangiales have been derived by the formation of the asci in a region delimited by the stroma and by the elongation of those asci pointing toward the side at which the spores are expelled. A sharper localization of the asci to a region in the stroma at which gelatinization of the sterile tissue occurs results in the Bagnisiopsideae in a plurilocular stroma. In the Parodiellineae the stroma is separated into unilocular elements, the perithecia appearing as pimples on the surface. The tendency of these fungi to become largely external is pronounced in the last 2 tribes. At the same time the stromatic portion of the fructification tends to disappear and a filamentous external mycelium develops. In some of the Parodiopsideae the perithecium has a distinct stromatic base. The external mycelium is more or less united with the perithecial wall and the internal mycelium remains abundant. The Erysipheae show parallelism with the Parodiopsideae with more marked differentiation, the globose and well developed perithecia being loosely attached to the external mycelium and sometimes becoming free.

Except in *Bagnisiopsis* the perithecia of the Parodiellinaceae do not possess structures resembling paraphyses though the sterile tissue about the asci persists for a long time in the Parodiellineae and Parodiopsideae.—*E. Foëx.*

4249. BARTLETT, H. H., and CARL D. LA RUE. **A demonstration of numerous distinct strains within the nominal species Pestalozzia Guepini Desm.** Amer. Jour. Bot. 9: 79–92. 1921.—Tropical species of *Pestalozzia*, parasitic on cocoanut palm, *Hevea*, tea, and other hosts, have been difficult to treat taxonomically, the 2 species *P. palmarum* and *P. Guepini* being variable and impossible to differentiate from each other. Statistical studies, based on measurements of spore length and appendage length, of 35 isolations from various hosts show that numerous strains, morphologically distinct from one another, may be isolated and that these strains do not appear to be confined to particular hosts. A nominal species may thus be resolved into an indefinite number of distinct strains. The species concept in the Fungi Imperfecti is of necessity a highly artificial one. The ultimate unit, an impracticable one for purposes of classification, is the pure line descended from a single spore.—*E. W. Sinnott.*

4250. BOSE, S. R. **Two new species of Polyporaceae.** Jour. Indian Bot. 2: 300–301. *2 pl.* 1921.—As part of a survey of the Polyporaceae of Bengal, the author describes and figures 2 new species: *Polyporus friabilis,* also from Orissa and Madras, and *Polystictus Sarbadhikarii.*—*Winfield Dudgeon.*

4251. CORNWALL, G. F. **The vegetable caterpillar.** Sci. Amer. 126: 128. *1 fig.* 1922.—A note on fungi which take possession of the bodies of caterpillars and worms.—*Chas. H. Otis.*

4252. EZEKIEL, WALTER N. **Some factors affecting the production of apothecia of Sclerotinia cinerea.** Phytopathology 11: 495–499. 1921.—A study has been made to determine the effect of temperature, moisture, and depth of covering on the development of apothecia of *Sclerotinia cinerea* (Bon.) Schröter, and to determine whether a dormant period of more than 1 year is required by the mummies. A quantity of fresh mummies from peaches and plums artificially infected in the laboratory was divided into 20 lots and placed at various depths in trays filled with a soil mixture made up to simulate Norfolk Sandy Loam. The trays were placed under various conditions of temperature and moisture. Apothecia developed during the following spring on the lot kept under natural conditions. In another lot kept in a refrigerator until November and then transferred to a greenhouse, 3 mummies appeared on January·13. No apothecia appeared on any of the other mummies kept under artificial conditions. No apothecia developed from any mummy entirely covered with soil. In another series, a number of mummies on which the apothecia had already begun to form were placed on the surface or at various depths in soil. From those on the surface and from those partly covered apothecia were produced in abundance, but none developed from those entirely covered with soil.—*B. B. Higgins.*

4253. GWYNNE-VAUGHAN, (DAME) HELEN. **Fungi: Ascomycetes, Ustilaginales, Uredinales.** *xi + 232 p., 197 fig.* Cambridge Univ. Press: Cambridge, 1922.—Since the writer, formerly HELEN C. I. FRASER, is well known as a student of the cytology of fungous reproduction, it is not surprising that the book is distinctly cytological in character. The limitation of its field is indicated by the title. The treatment is similar to that of DeBary's Comparative Morphology of the Fungi, Mycetozoa, and Bacteria, and the book may be regarded as supplementary to this older work. Taxonomy is subordinated to morphology and as the writer says "in dealing with objects so minute, morphology passes insensibly into cytology." An introductory portion of 33 pages contains chapters on General Characters of the Fungi; Saprophytism, Parasitism, and Symbiosis; Heteroecism; Biological Species; and Reactions to Stimuli. The special portion of the volume is subdivided according to the natural orders, and a bibliography of the important papers published since DeBary accompanies each. Those groups which are known most completely cytologically are the more fully treated. The Phycomycetes, Fungi Imperfecti, and Basidiomycetes exclusive of the rusts and smuts are omitted from consideration as are also the slime moulds, bacteria, and lichens. The illustrations are for the most part cytological in character and are taken largely from the more recent literature.—*H. M. Fitzpatrick.*

4254. Györffy, I. **Novitas bryologica.—II.** [Bryological novelty.] Bryologist 25: 18. *Fig. 1.* 1922. [In Latin, with an English abstract.]—The author notes previous records of the occurrence of species of the fungus genus *Cladosporium* upon mosses. The present note records the occurrence of *C. herbarum* on capsules of *Campylopus* from Tasmania.—*E. B. Chamberlain.*

4255. Hu, Hsien Su. **[Collection notes of Chekiang fungi.]** Ko-Hsueh [Science-Publication of the Chinese Science Society] 6: 1137–1143. 1921. [Text in Chinese.]—The writer has collected 33 species of Polyporaceae, 2 of Thelephoraceae, 3 of Nidulariaceae, and 1 of Agaricaceae in the province of Chekiang. The collected fungi have been indentified by C. G. Lloyd with notes appended. Six fungi are given as new species: *Polystictus prosector, Lenzites sinensis, Daedalea sinensis, Polyporus duroporus, P. Huii,* and *Stereum sinensis.*—*Chunjen C. Chen.*

4256. Jackson, H. S. **New or noteworthy rusts on Carduaceae.** Mycologia 14: 104–120. 1922.—The following are included: *Puccinia clara* nom. nov. on *Vernonia scariosa, P. redempta* sp. nov. on *Eupatorium atriplicifolium, P. Parthenices* sp. nov. on *Parthenice mollis, P. turgidipes* sp. nov. on *Viguiera deltoidea Parishii, P. triannulata* (Berk. & Curt.) comb. nov. on *Borrichia frutescens, P. vaga* sp. nov. on *Verbesina* sp., *P. Flaveriae* sp. nov. on *Flaveria campestris,* and *Uredo abdita* sp. nov. on *Senecio Cineraria.* A key is given to the North American Puccinias on *Verbesina.*—*H. R. Rosen.*

4257. Miles, L. E. **A new species of Myriangium on pecan.** Mycologia 14: 77–80. *Pl. 14.* 1922.—A technical description is given of *Myriangium tuberculans* sp. nov. occurring superficially on the bark of living pecans.—*H. R. Rosen.*

4258. Murrill, William A. **Another green-spored genus of gill-fungi.** Mycologia 14: 96–98. 1922.—Chlorosperma gen. nov. is described with the single species *C. olivaespora* (Ellis and Ev.) comb. nov. It differs from *Hypholoma* in having greenish spores.—*H. R. Rosen.*

4259. Murrill, William A. **Dark-spored agarics—I. Drosophila, Hypholoma, and Pilosace.** Mycologia 14: 61–76. 1922.—Descriptions are given of 14 species. The following new combinations are made of agarics previously placed in *Hypholoma* and now included in *Drosophila: D. madeodisca* (Peck), *D. pecosense* (Cockerell) (after this combination was in type the species was found to be of *Stropharia*), *D. fragilis* (Peck), *D. Storea* (Fries), *D. delineata* (Peck), *D. Peckiana* (Kauffm.), *D. echiniceps* (Atk.), *D. rigidipes* (Peck), and *D. hololanigera* (Atk.).—*H. R. Rosen.*

4260. Murrill, William A. **Dark-spored agarics—II. Gomphidius and Stropharia.** Mycologia 14: 121–142. 1922.—Species of temperature regions of eastern North America of the genera *Gomphidius* and *Stropharia* are described. A key to the species of each genus is given, the 1st comprising 7 species, and the 2nd 20, including: *S. acuminata* (Scop.) comb. nov., *S. anellariformis* sp. nov., *S. adnata* (Huds.) comb. nov., *S. campestris* Peck ms., *S. tenius* sp. nov., *S. subbadia* sp. nov., *S. rugoso—annulata* Farlow ms., and *S. elegans* sp. nov.—*H. R. Rosen.*

4261. Peyronel, B[eniamino]. **Nuovi casi di rapporti micorizici tra basidiomiceti e fanerogame arboree. [New cases of mycorhizal relationships between basidiomycetes and arboreal phanerogams.]** Boll. Soc. Bot. Ital. 1922: 7–14. 1922.—The present is the continuation of a previous report [Staz. Sper. Agrarie Ital. 53: 24–31. 1920]. The author followed the mycelial strands from the visible body of the basidiomycete to the root of the tree, observing that in such cases as *Boletus cyanescens*, which has highly colored mycelium, the mycorhizal mat, or "micoclena," assumes the color characteristic of the basidiomycete. Thus to a trained observer a direct macroscopical observation of the roots affected may indicate the type of mycorhizal relation existing in the particular case. The case of *Boletus scaber* is mentioned for its interest relative to its change of general form, size of cap, color and diameter of stem according to whether it is connected with *Betula alba* or *Corylus*, *Quercus*, or *Castanea*. *Boletus rufus* is according to the author only *Boletus scaber* in direct mycorhizal connection with *Populus tremula*. This example is emphasized for its significance in taxonomy. Mycorhizal relationships are more frequent in poor sandy soils than in rich humiferous ones where the fungus can lead an independent existence. The following relations are listed: on *Fagus silvatica* may be found *Cortinarius proteus*, *Boletus cyanescens*, *B. Chrysenteron*, *Hypochnus cyanescens* n. sp., *Scleroderma vulgare;* on *Corylus Avellana*, *Lactarius Coryli* n. sp., *Boletus Chrysenteron*, *Strobilomyces strobilaceus*, *Hypochnus cyanescens* n. sp.; on *Betula alba*, *Amanita muscaria*, *Lactarius necator*, *Boletus scaber*, *Scleroderma vulgare;* on *Larix decidua*, *Amanita muscaria*, *Russula laricina* n. sp., *Hygrophorus Bresadolae*, *H. lucorum*, and *Scleroderma vulgare*.—*A. Bonazzi.*

4262. Reichert, Israel. **Die Pilzflora Agyptens. Eine mykogeographische Studie. [The fungus flora of Egypt. A study in mycogeography.]** Bot. Jahrb. **56:** 598–727. *Pl. 2–4.* 1921.—This very extensive paper is the result of a study of the specimens of Egyptian fungi in the Berlin Botanical Museum. Not only are 38 species described as new, but the work has been used to test the application of principles of plant geography to the fungi. This portion of the study especially has been most intensive and comprehensive. Egypt is considered a favorable locality for such study. The subject matter is treated under the following heads: I. Introduction. A. History of mycological investigations in Egypt. B. Sources of information. 1. Collection. 2. Literature. II. Treatment. Part 1. Ecological factors. Chap. 1. Arography and vegetation of the region. Chap. 2. Climatology. Chap. 3. Substratum. Part 2. The fungus vegetation. Section 1. General. Chap. 1. Discussion of the synecological principles among fungi. Chap. 2. Methods. Section 2. Fungus formations of the regions. Chap. 1. Hydrophilous formations. Chap. 2. Xerophytic formations. Chap. 3. Halophytic formations. Chap. 4. Cultivated land. Section 3. Ecological adaptations. Part 3. Distribution and origin of the Egyptian fungus flora. Chap. 1. Aim and fundamental conceptions: (a) The fungus species and their origin, (b) migration of fungi, active distribution, passive distribution by wind, animals, and water, (c) restriction in migration, geographical and ecological; (d) age and original home of fungi; (e) discussion of impression elements; (f) methods. Chap. 2. Geographical considerations: (a) history of geographical divisions among the fungi; (b) attempt to divide the Egyptian fungus flora into component parts (the classification is given); (c) conclusions and summary. Chap. 3. Genetical considerations: (a) history of the genetical subdivision of the fungi; (b) attempt to divide the Egyptian fungi into locative elements; (c) attempt to classify the Egyptian fungi into historical elements. Chap. 4. Migratory considerations: (a) history of the migratory division of fungi; (b) attempt at a division into locative migrants; (c) attempt at a division into historical migrants. Part 4. The fungus flora of Egypt. Phycomycetes, 6 species, Ascomycetes, 28 species, Ustilaginaceae, 24 species, Tilletiaceae, 5 species, Melampsoraceae, 5 species, Pucciniaceae, 54 species, Corticiaceae, 1 species, Hydnaceae, 1 species, Polyporaceae, 8 species, Agaricaceae, 32 species, Phallaceae, 2 species, Hymenogastrineae, 17 species, Fungi Imperfecti, 53 species. The following new species are proposed: *Phyllachora Ehrenbergii*, *Sphaerodothis Schweinfurthii*, *Mycosphaerella Engleriana*, *Pleospora Lindaviana*, *P. aegyptiaca*, *P. rotundata*, *Glonium Salsolae*, *G. guttulatum*, *Puccinia paraphysata*, *Uredo coloni*, *U. Cyperi-alopecuroidis*, *U. Euphorbiae-prunifoliae*, *Lentinus integrus*, *L. omphalopsis*, *Pholiota alexandrina*, *Flammula acuminatospora*, *F. Schweinfurthii*, *Clitocybe Mairii*, *Macrophoma Engleriana*, *Coniothyrium Diedickeanum*, *C. Sporoboli*, *Microdiplodia Machlaiana*, *Diplodia Warburgiana*, *Melanconium echinosporum*, *Torula Opuntiae*, *Hormiscium saccharicolum*, *H. Calligoni*, *Bispora opuntiicola*, *Fusicladium Cynanchi*, *Cladosporium Acaciae*, *C. pyriformum*, *C. Hibisci*, *Clasterosporium Lindavianum*, *Coniothecium heterosporum*, *Sporodesmium longipedicellatum*, *Macrosporium*

Euphorbiae, M. Oleae, Cercospora Snelliana, Stilbella Dielsiana, Clathrococcum Magnusianum. The following are new combinations: *Guignardia aegyptica* (*Verrucaria aegyptica* Müller), *Sphacelotheca Penniseti* (*Ustilago Penniseti* Rbh.), *Psathyra Schweinfurthii* (*Psathyrella Schweinfurthi* Roumeg.).—*K. M. Wiegand.*

4263. Rodway, L. **On Polyporus pulcherrimus, n.s.** Papers and Proc. Roy. Soc. Tasmania **1921**: 176. 1921.—*Polyporus pulcherrimus* n. sp. is described, occurring on evergreen beech and eucalyptus as a wound parasite. It is related to *Polyporus confluens.*—*J. H. Faull.*

4264. Saito, Kendo, unter Assistenz von H. Naganishi. **Untersuchungen über die atmosphärischen. Pilzkeime. III. Mitteilung.** [Researches on atmospheric yeasts. III.] Japanese Jour. Bot. **1**: 1–54. *Pl. 1–3.* 1922.—In this article the author continues his studies of organisms obtained from the air. His previous papers covered molds and bacteria. Yeast-like forms only are discussed and their frequency at particular seasons and in particular localities are estimated. Platings were made 6 times a month throughout 1915 and 1917 in the neighborhood of the author's laboratory in Dairen. For this purpose petri dishes were exposed 10 minutes and then incubated 1 week at temperatures from 16 to 21°C. Computations were based upon the count of organisms found on 60 square cm. of media. The total counts obtained were tabulated with the outside temperature, the barometric reading, the velocity of the wind, and the state of the weather, especially the relation of the plating time to periods of rain or snow precipitation. Subjoined to the table for each month the frequency of each species reported is also tabulated. In experiments with the air of school rooms, yeast-like forms were few except those of 1 species, *Torula gelatinosa.* In general, only a small number of yeasts were obtained from open air spaces. In samples taken near the experimental brewery, the fermentation organism in principal use, *Saccharomyces mandshuricus,* was found but once. Other saccharomycetes as distinct from Torulaceae were also rare. The Torulaceae were commonly found. All of these are reported in the genus *Torula* except *Pseudosaccharomyces Mülleri,* and are divided into 2 groups,—those with colorless colonies and chromogenous forms. Among the colorless forms *T. fermentati* n. sp. proved an active invertase and alcohol producer. Among the colored species *T. gelatinosa* n. sp., a yellowish gray form, was common at all seasons. In a series of species buried in the soil, all species used survived 1 winter but aside from spore formers but 1 lived through the 2nd winter.—Diagnoses of species are presented based upon the following points: (1) form and size of the cells grown upon Koji decoction and upon Koji decoction agar; (2) pellicle and ring formation in Koji decoction at 25°C. in 3 weeks; (3) potato cultures after 2 weeks at 20°C.; (4) fermentation activities with sugars by Lindner's method; (5) the test for sugar-splitting enzymes in non-fermenting forms,—obtained by growing each yeast to be tested in a hollow slide containing a disaccharide and *Saccharomyces apiculatus,* which ferments only hexoses. The presence of gas in such a culture indicates such splitting of sugars as makes fermentation by *S. apiculatus* possible. (6) Spore formation upon gypsum blocks, Gorodokowa's agar, and carrot; (7) alcohol and acidity in Koji decoction were determined after 3 months. The following are described: *Saccharomyces mandshuricus* Saito, *Debaromyces tyrocola α* Nadson & Konokotine, *D. tyrocola β* Nadson & Konokotine, *D. membranaefaciens* Naganishi, *Pichia membranaefaciens* Hansen, *Willia anomala, Pseudosaccharomyces Mülleri* Klöcker, *Torula fermentati* n. sp., *T. candida* n. sp., *T. aerius* n. sp., *T. gelatinosa* n. sp., *T. albida* n. sp., *T. flavescens* n. sp., *T. aurea* n. sp., *T. luteola* n. sp., *T. flava* n. sp., *T. aurantiaca* n. sp., *T. sanguinea* Schimon (?), *T. rufula* n. sp., *T. rubescens* n. sp., *T. corallina* n. sp., *T. rubra* Schimon (?), *T. minuta* n. sp., *T. rugosa* n. sp., *T. ramosa* n. sp. A key to these species is given. In summarizing the results the following items are emphasized: yeasts were more common (1) in cold than in warm weather, (2) in dry than in moist weather, (3) on windy days than still days. In rainy or snowy periods very few yeasts were found.—*Chas. Thom.*

4265. Seaver, Fred Jay. **Phyllostictales. Phyllostictaceae (pars).** North Amer. Flora **6**: 1–84. 1922.—The author proposes the name Phyllostictales for the order previously known as Sphaeropsidales since *Sphaeropsis* is considered non-valid and therefore the name Sphaeropsidales untenable. The order is credited with having 4 families. The treatment of the 1st family is begun in this number. A key is given to the 8 tribes of the Phyllostictaceae. The genus *Phyllosticta* with 300 species is treated in detail; this genus constitutes the 1st tribe in this family. A key is given to the species of *Phyllosticta* based primarily on the size of the spores and the identity of the host plants. The following new species, new transfers, and new names are proposed: *Phyllosticta Hymenocallidis, P. concava, P. Meibomiae, P. texensis* (*P. verbenicola* Tharp, not Martin), *P. intermixta* (*P. populina* Sacc., not Pers.), *P. Delphinii* Clements, *P. Adoxae* Clements, *P. virginiana* (*Phoma virginiana* Ellis and Halsted). A host index for the species of *Phyllosticta* is given; 23 doubtful and excluded species are listed.—*E. B. Payson.*

4266. Snell, Walter H. **A new Septobasidium on Pinus Strobus.** Mycologia 14: 55–60. *Pl. 11–13.* 1922.—A description is given of *Septobasidium pinicola* sp. nov., an epiphyte found on bark of living trees.—*H. R. Rosen.*

4267. Spegazzini, Carlos. **Algunas observaciónes relativas a las hojas de coca. (Erythroxylon coca Lam.) [Observations on the leaves of coca. (Erythroxylon coca.).]** An. Soc. Cien. Argentina 90: 23–32. 1920.—The author describes the custom of "acollijo," or coca-leaf chewing, in the northern part of Argentina. The preparation and mixing with "yicta" is described. Yicta is the product of incomplete combustion of leaves of halophilous plants such as *Chenopodium hircinum, C. album, C. rubrum, C. quinoa, Atriplex montevideensis, A. pamparum, Salicornia corticosa*, etc. The function of these substances is to liberate, by means of their alkalinity, the cocaine from the coca. Several fungi are described which the author found growing on dried coca leaves ready for consumption, but no definite statement is made as to whether these forms had affected the leaves before or after picking. Botanical descriptions are given for the following organisms: *Uredo Erythroxyli* Graziani, *Sphaerella Erythroxyli* Speg. n. sp., *Ravenelula boliviensis* Speg. n. sp., *Protomyces* (?) *cocae* Speg. n. sp., *Phyllosticta Erythroxyli* Graziani, *Colletotricum cocae* Speg. n. f., *Cercosporella cocae* Speg. n. f., *Aspergillus cinereus* Speg.—*A. Bonazzi.*

4268. Sydow, H. **Fungi novo-guineenses.** Bot. Jahrb. 57: 321–325. *Fig. 1.* 1922.—This is No. 68 of series VIII of Beiträge zur Flora von Papuasien. The following species are described as new: *Gibellula aranearum, Calostilbe Ledermannii, Cordyceps ctenocephala, C. stiphrodes, C. dimeropoda, C. opposita*, and *Melogramma novoguineense.*—*K. M. Wiegand.*

4269. Sydow, H., und P. [Sydow.] **Die Pilze Mikronesiens aus der Sammlung Ledermann. [The fungi of Micronesia from the collections of Ledermann.]** Bot. Jahrb. 56: 430–432. 1921.—This is No. 1 of the series Beiträge zur Flora von Mikronesien und Polynesien, edited by L. Diels. The list consists of 13 species of Basidiomycetes of which *Cyphella Ledermannii* is described as new, 6 Ascomycetes of which *Meliola dolabrata* is new, and 2 Fungi Imperfecti.—*K. M. Wiegand.*

4270. Thaxter, Roland. **Reliquiae Farlowianae.** Mycologia 14: 99–103. 1922.—An explanation is given of a set of exsiccati containing New England fungi, lichens, liverworts, and mosses, largely collected and determined by Dr. Farlow. Notes and descriptions of 12 species of fungi and 1 moss are given including *Diatrypella ciliatula* (Fr.) Farlow nov. comb., *Cenangium querneum* (Schw.) Seymour (*C. turgidum* (Schw.) Fries), *Godronia turbinata* (Schw.) Farlow nov. comb., *Pezicula pruinosa* Farlow nov. sp., perfect stage of *Sphaeronema pruinosum* Pk., *Scleroderris Cephalanthi* (Schw.) Farlow nov. comb., *Aposphaeria bruneotincta* Farlow nov. sp., and *Calicium Rhois* (B. & C.) Farlow nov. comb. *Constantinella cristata* Matruchot is noted in America for the first time.—*H. R. Rosen.*

4271. Tsou, Chung Ling. **[A list of fungi of Nanking.]** Ko-Hsueh [Science-Publication of the Chinese Science Society] 7: 184–195. 1922. [Text in Chinese.]—The writer has collected and determined about 165 species of fungi in the locality of Nanking, China. The host names are also indicated.—*Chunjen C. Chen.*

4272. Wiltshire, S. P. **The production of conidia in pure cultures by the brown rot fungus of the apple.** Jour. Bath and West and Southern Counties Soc. **14**: 123–126. 1920.—Irish potato plugs soaked in 7.5 per cent malic acid was the best of the various media tried for the production of conidia by *Sclerotinia fructigena*, the conidia being produced in abundance.—*J. I. Lauritzen.*

LICHENS

4273. Burnham, Stewart H. **Lichens of the Lake George region.** Bryologist **25**: 1–8. 1922.—With this article the author begins publication of an annotated list of the lichens collected by various persons in Saratoga, Warren, and Washington counties, New York, during the past 50 years, 100 species or varieties being listed in the present installment. Definite specimens are cited in each case with some considerable reference to herbaria. There are a few critical notes on the determinations, mostly by G. K. Merrill. *Catillaria intermixta* (Nyl.) Merr. & Burn., *Bacidia suffusa* (Fr.) Merr. & Burn., and *Cladonia ochrochlora coniocraea* (Flk.) Merr. & Burn., are new combinations. [See also following entry.]—*E. B. Chamberlain.*

4274. Burnham, Stewart H. **The lichens of the Lake George region (continued).** Bryologist **25**: 34–37. 1922.—This list mentions with notes, as previously outlined [see preceding entry], 47 species or varieties of lichens from the vicinity of Lake George, New York. The following new combinations occur: *Acarospora Clavus* (DC.) Burn. replacing *Lecidia eucarpa* Nyl., *Collema rupestris* (Sw.) Burn. replacing *C. flaccidum* Ach., and *Parmeliella crossophylla* (Tuck.) Merr. & Burn. replacing *Pannaria crossophylla* Tuck.—*E. B. Chamberlain.*

4275. Fink, Bruce. **A new lichen from an unusual substratum.** Mycologia **14**: 95–96. 1922.—*Thelocarpon fimicola* Fink sp. nov. is described as growing with algae on cow dung.—*H. R. Rosen.*

4276. Olivier, H. **Les lichens pyrenocarpes de la flore d' Europe. [The pyrenocarpous lichens of the flora of Europe. (Continued.)]** Bull. Géog. Bot. **27**: 6–16. 1919.—The present installment begins with the continuation of a key, begun in the 3rd, on *Polyblastia* (Mass.) Oliv., based on apothecia, hypothalli, ostiola, size of spores, and habitat. This is followed by a description of 18 genera under the heading Sub-class A. Microglaena Krb.—*W. G. Waterman.*

4277. Watson, W. [Rev. of: Smith, Annie Lorrain. **Lichens.** *xxviii + 464 p., 135 fig.* Cambridge University Press: 1921 (see Bot. Absts. 11, Entry 3459).] New Phytol. **21**: 102–106. 1922.

BACTERIA

4278. Hall, Ivan C. **Differentiation and identification of the sporulating anaerobes.** Jour. Infect. Diseases **30**: 445–504. 1922.—The author presents a detailed study of the taxonomy of the obligate anaerobes based upon a collection of carefully and repeatedly purified strains. It is pointed out that a large number of cultures are usually misnamed and contaminated with other anaerobes. The deep colony methods were found superior to the surface colony methods. Morphology, action on proteins, and action on carbohydrates are utilized in setting up a differential key to be used in the identification of the most common forms.—*Selman A. Waksman.*

4279. H[arper], J[ohn]. [Rev. of: Jordan, Edwin O. **A text-book of general bacteriology.** *7th ed.* Wm. Saunders: Philadelphia, 1922.] Absts. Bact. **6**: Entry 1262. 1922.—Several chapters have been revised or rewritten and enlarged. A commendable feature is the effort to get away from the present loose and unsatisfactory bacteriological nomenclature by using, so far as practicable, the nomenclature proposed by the committee of the Society of American Bacteriologists.—*D. Reddick.*

4280. H[arper], J[ohn]. [Rev. of: Kendall, Arthur I. **Bacteriology, general, pathological, and intestinal.** *2nd ed.* Lea and Febiger: Philadelphia, 1921.] Absts. Bact. **6:** Entry 1263. 1922.—The 1st edition has been thoroughly revised and, where needed, rewritten. "This newer edition will prove even more popular than the preceding one."—*D. Reddick.*

4281. H[arper], J[ohn]. [Rev. of: Zinsser, Hans. **A textbook of bacteriology, with a section on pathogenic protozoa by** Frederick F. Russell. *5th ed.* Appleton: New York, 1922.]—"A new edition in every sense of the term." An outstanding feature is a successful effort on the part of authors to correlate laboratory knowledge with clinical and preventive medicine.—*D. Reddick.*

4282. Seaver, F. J. [Rev. of: Macbride, T. H. North American slime-moulds. *xvii + 299 p., 23 pl.* Macmillan Co.: New York, 1922 (see Bot. Absts. 11, Entry 3446).] Torreya **22:** 50–52. 1922.—This revision of the original edition adds extensive notes and observations to the technical descriptions. In nomenclature the oldest recognizable names are followed, without regard to rule or date. American and European names are correlated. The plates show habit sketches and microscopic details.—*J. C. Nelson.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

Edward W. Berry, *Editor*

(See also in this issue Entries 3487, 3511, 3589, 4632, 4683)

4283. Beck, Richard. **Alethopteris Pfeilstickeri, ein neuer Farn aus dem Oberkarbon von Lugau-Ölsnitz. [A new fern from the Upper Carboniferous of Lugau-Ölsnitz.]** Sitzungsber. u. Abhandl. Naturwiss. Ges. "Isis" **1917:** 23–28. *3 fig.* 1919.—Under the name *Alethopteris Pfeilstickeri* a new Carboniferous fern from Lugau-Ölsnitz in Saxony is described and figured. It is especially remarkable because it shows well-marked sori of the polypodiaceous type, thus proving that some of Alethopterids are true ferns and not Pteridospermophytes, as certain authors have supposed. The sori occur in uniseriate rows between the veinlets of the ultimate divisions. At the close of the paper the differential characters separating the new Alethopteris from other species are enumerated, and a short list is given of characteristic plant fossils from the same deposit.—*A. W. Evans.*

4284. Berry, Edward W. **Fossil plants from Corocoro, Bolivia.** Johns Hopkins Studies Geol. **1:** 87–113. *Pl. 7.* 1922.—The author describes 23 species of plants of Pliocene age from the Corocoro copper deposits. New species are described in the genera *Osteomeles, Dodonaea, Vaccinium,* and *Carpolithes.*—*E. W. Berry.*

4285. Calcagni, G. **Una nuova ipotesi sull'origine dei combustibili naturali. [A new hypothesis on the origin of natural fuels.]** Gazz. Chim. Ital. **52^2:** 87–93. 1922.—The author attempts to refute the various hypotheses, ascribing an organic origin to oils, coals, and gas, and advocates the direct synthesis of these compounds at high temperatures from the elements in the archaic epoch, with subsequent rearrangements of the molecules in subsequent geologic periods. The plant remains are considered by Calcagni as accidental inclusions in the carboniferous zones.—*A. Bonazzi.*

4286. Chapman, F. **A sketch of the geological history of Australian plants; the Cainozoic flora.** Victorian Nat. **37:** 115–119, 127–133. *Pl. 6, 7, 8.* 1921.—The distribution and character of the fossil plants from each of the important localities are described.—*Wm. Randolph Taylor.*

4287. Chiovenda, Emilio. **La culla del cocco. [The birthplace of the coconut.]** Webbia **5:** 199–294. 1921.—Considerable diversity of opinion exists among writers quoted, as to origin of coconut. (1) The tribe *Cocoineae* is distributed throughout the tropics and subtropics of America. (2) The genus "Cocos L." is entirely distinct from related American genera. (3)

The many cultivated varieties (more numerous in the Old than the New World) propagate naturally from seed. (4) Anatomical structure of the fruit shows it to be eminently fitted for marine dispersal. (5) Germinating processes of the seed especially adapted to maritime life. (6) Diffusion of the species has probably been from west to east, with origin of a great many located in the region of the Indian Ocean. (7) The coconut by its spontaneous vegetation is related to coral formation, and should therefor have originated in the atolls of the Indian Ocean, where *Lodoicea*, with similar fruit, is native. (8) Lesser degree of polymorphism existing in the New World indicates cultivation there for much shorter period of time. Geological arguments.—(1) The coconut is associated with coral islands, which represent the last record of old land disappearing by submersion. (2) Paleogeographers postulate a submerged landmass, partly in the western Indian Ocean, between India and Madagascar. Ethnological arguments.—(1) The islands of the Pacific were settled by a race of men from the west, who introduced the coconut which had probably not existed there previously. (2) The coconut is of comparatively recent introduction in the Pacific and was accomplished by men native to the Malesian Islands.—*John M. Fogg, Jr.*

4288. Dall, W. H. [Rev. of: Baker, Frank Collins. **The life of the Pleistocene or Glacial period.** Univ. Illinois Bull. 17^{41}: iii–476. 57 pl. 1920 (see Bot. Absts. 11, Entry 1690).] Science **54**: 606. 1921.

4289. Dines, J. S.; also F. J. Allen. **Where did terrestial life begin?** Nature **109**: 207. 1922.—Of these 2 separate communications, the 1st suggests that meterological evidence does not support Gregory's conclusion [Nature **109**:107. 1922] that mountain tops would be subject to fluctuations in temperature which would render life impossible. The 2nd suggests that life may have existed before there were either mountains or seas.—*O. A. Stevens.*

4290. Fritsch, F. E. **Thalassiophyta and the algal ancestry of the higher plants.** New Phytol. **20**: 165–178. 1921.—One phase of Church's theory [see Bot. Absts. 9, Entry 344] "hypothecates that the first landplants originated, not from simple filamentous Algae, but from bulky Seaweeds of some considerable dimensions . . . ." The ancestry of land plants is assumed to lie among green algae of extinct or modern types. There do not seem to be adequate grounds for believing that conditions in fresh water are necessarily less favorable for growth than are those in salt water or that freshwater algae are as a whole reduced forms. It is more likely that the transmigrant green alga was at about the level or perhaps slightly above the level of present-day forms in morphological development. In the extended discussion of this proposition consideration is given to the terrestrial green algae; to the development of the somatic characters of land plants; to the origin of alternation of generations; to the changes involved in the assumption of a land-life; and to the origin of reproductive structures. Brief reference is made to the mode of transmigration.—*I. F. Lewis.*

4291. Gravis, A. **Le froment néolithique d'Oudoumont.** [Neolithic wheat of Oudoumont.] Arch. Inst. Bot. Univ. Liége **5**: 1–3. 1914 [1920].—A description of the cleaning of the grains by hand.—*Henri Micheels.*

4292. Gress, E. M. **An annotated list of fossil plants of the Dakota formation (Cretaceous) in the collections of the Carnegie Museum, including descriptions of three new species.** Ann. Carnegie Mus. **13**: 274–332. *Pl. 14, 15.* 1922.—The author abstracts the geologic literature relating to the Dakota, gives an annotated list with synonymy and describes as new *Protophyllum ovatum*, *P. viburnifolium*, and *Platanus cissitifolia.*—*E. W. Berry.*

4293. Leslie, T. N. **Observations on some fossil plants from the Permo-Carboniferous of Vereeniging.** Proc. Geol. Soc. South Africa **24**: xix–xxx. *Pl. 1.* 1922.—The author gives a nonscientific discussion of the Permian plants of Vereeniging belonging to the Glossopteris flora.—*E. W. Berry.*

4294. McLean, R. C. **On the fossil genus Sporocarpon.** Ann. Botany 36: 71–90. *Pl. 18–19.* 1922.

4295. Meschinelli, Luigi. **Su di un frutto fossile dell'eocene inferiore vicentino. [On a fossil fruit from the lower Eocene of Venetia.]** Atti R. Inst. Veneto 80^2: 1025–1032. *Pl. 1.* 1921.—A very well preserved fruit, *Apeibopsis victoriae*, from the lower Oligocene (Lattorfian) of Monte Berico, Venetia, is described.—*E. W. Berry.*

4296. Potonié, H. **Lehrbuch der Paläobotanik. [Textbook of Paleobotany.]** *2nd. ed.*, revised by Gothan, W., with contributions by Menzel, P., and J. Stoller. *v+514 p., 326 fig.* Gebrüder Borntraeger: Berlin, 1921. Unbound *80 Mk.;* bound *97 Mk. 50 Pfg.*

4297. Reid, Eleanor M. **Fossil buttercups.** Nature 109: 136. 1922.—Carpels of *Ranunculus* are among the most common fossils in Pleistocene and Pliocene in Britain and neighboring parts of the continent. "Obtained by washing and sieving away the matrix. Were this method applied to some of the North American Pleistocene and Tertiary deposits I should anticipate that they might yield not only abundant carpels of *Ranunculus*, but fruits and seeds of many other herbaceous plants." European records are cited. None examined have shown indications of 2 carpels.—*O. A. Stevens.*

4298. Round, Eda M. **A modern plant fossil.** Bull. Torrey Bot. Club 49: 63–64. *Fig. 1.* 1922.—An example was found of a polyporous shelf-fungus encrusting and preserving birch-leaves, thus illustrating a method "whereby fossils may have formed in the past or may develop under modern conditions."—*P. A. Munz.*

4299. Schönfeld, G. **Über einige neue Funde fossiler Hölzer aus der Umgebung Dresdens. [New discoveries of fossil wood in the vicinity of Dresden.]** Sitzungsber. u. Abhandl. Naturwiss. Ges. "Isis" 1918: 3–16. *Pl. 1, 5 fig.* 1919.—The author describes 3 types of woob from the vicinity of Dresden. The 1st, which dates from the Cretaceous period (Cenomanian Quader), represents the oldest dicotyledonous wood as yet known from Germany. Its affinities with the Lauraceae are demonstrated, and it is described as new under the name *Laurinium radiatum.* The presence of annual rings and the absence of primitive structural features are emphasized. The 2nd wood, which represents a gymnosperm of the Tertiary period, is referred to *Piceoxylon Pseudotsugae* Gothan, based originally on material from California. In its structure this wood agrees very closely with that of the living *Pseudotsuga Douglasii.* The 3rd wood, which is calamitean in character, is referred to *Arthropitys bistriata* Göpp., and it is clearly shown that *A. ezonata* Göpp. is merely an older stage of the same species, as Göppert himself suspected. On the plate the anatomical features of the new Laurinium are represented in transverse, radial, and tangential sections.—*A. W. Evans.*

4300. Walkom, A. B. **On a specimen of Noeggerathiopsis from the lower coal measures of New South Wales.** Proc. Linnean Soc. New South Wales 46: 374–375. *Pl. 25.* 1921.—A remarkably fine specimen of *Noeggerathiopsis Hislopi* from the Lower Permian of New South Wales is described and figured.—*E. W. Berry.*

4301. Walkom, A. B. **On the occurrence of Otozamites in Australia, with descriptions of specimens from Western Australia.** Proc. Linnean Soc. New South Wales 46: 147–153. *Pl. 10.* 1921.—The author records and figures the following from Jurassic beds in Western Australia: *Otozamites Bechei* Brongniart, *O. Feistmanteli* Zigno, and *O. bengalensis* Old. & Morris. —*E. W. Berry.*

PATHOLOGY

Frederick V. Rand, *Editor*

Lillian C. Cash, *Assistant Editor*

(See also in this issue Entries 3279, 3300, 3306, 3316, 3323, 3344, 3351, 3363, 3365, 3381, 3383, 3390, 3393, 3397, 3399, 3403, 3404, 3408, 3435, 3439, 3459, 3475, 3496, 3564, 3671, 3677, 3697, 3707, 3742, 3744, 3748, 3752, 3760, 3788, 3822, 3858, 3865, 3912, 3915, 3916, 3922, 3940, 3952, 3954, 3955, 3970, 3973, 3976, 3990, 3995, 4014, 4021, 4036, 4043, 4062, 4171, 4174, 4184, 4203, 4214, 4215, 4248, 4249, 4252, 4253, 4254, 4256, 4261, 4263, 4272, 4594, 4622, 4632, 4642, 4683, 4701, 4702, 4703, 4707, 4790, 4887)

DISEASES CAUSED BY FUNGI

4302. Anonymous. **Die Krebswiderstandsfähigkeit der Kartoffelsorten Deutschlands. [Wart resistance of potato varieties in Germany.]** Oesterreich. Zeitschr. Kartoffelbau 2: 8. 1922.—This supplements previous reports under the same title by giving results of wart-susceptibility tests conducted by the Biologische Reichsanstalt, Berlin-Dahlem, in 1921. No additions are made to the list of immunes.—*F. Weiss.*

4303. Adams, J. F., and T. F. Manns. **The corn ear worm and kernel rot of corn.** Phytopathology 12: 25–26. 1922.—Rots of corn (*Zea Mays* L.) kernels, due to *Fusarium moniliforme* and *Cephalosporium Sacchari*, have been found developing consistently in ears injured by the corn ear worm (*Heliothis armiger*).—*B. B. Higgins.*

4304. Agati, Julian A. **Banana stem and fruit rot.** Philippine Agric. 10: 411–422. 1922.—A study was made in the Philippines of the disease caused by *Gloeosporium Musarum* Cooke and Massee, which attacks the stem, the immature fruit, and the fruit in storage. The article reports symptoms of the disease, spore dissemination, methods of isolating the fungus, artificial inoculation experiments, and morphological, taxonomic, and physiological studies of the fungus.—*Sam F. Trelease.*

4305. Anderson, H. W. **Orchard practice for the control of blister canker of apple trees.** Illinois Agric. Exp. Sta. Circ. 258. *16 p., 12 fig.* 1922.—Methods for the detection and control of blister canker of apple trees, caused by *Nummularia discreta*, are discussed. The Ben Davis variety is particularly susceptible to the disease and its elimination, under Illinois conditions, would mean nearly complete elimination of losses from that disease.—*O. H. Sears.*

4306. Anderson, M. L. **Soil conditions affecting the prevalence of Fomes annosus (Trametes radiciperda).** Trans. Roy. Scottish Arbor. Soc. 35: 112–117. 1921.—*Fomes annosus* which attacks the roots of conifers, thus causing a form of heart-rot and root-rot, rarely fruits on sandy open soils but commonly does so on stiff clay soils. It is fully as prevalent in the former as in the latter, however, and because of lack of fruit bodies it may be overlooked in plantations on sandy soils where it may do considerable damage underground, spreading from tree to tree by hyphal growth. Roots can not be attacked unless injured; injury may result from acidity of the soil. This is indicated by the prevalence of the fungus under conditions which induce acidity of the soil. Prevention can be brought about by resorting to silvicultural measures that will lessen the acidity or that will substitute resistant hardwoods for the susceptible conifers.—*C. R. Tillotson.*

4307. Atkins, W. G. R. **Note on the occurrence of the finger and toe disease of turnips in relation to the hydrogen ion concentration of the soil.** Notes Bot. School Trinity Coll. [Dublin] 3: 191–198. 1922.—One of 2 adjacent fields of similar clay soil was found to be badly infested with and the other free from finger and toe disease, due to *Plasmodiophora Brassicae* Woron., in the turnip crop. They contained, respectively, 0.17 and 0.40 per cent of calcium, calculated as oxide. The hydrogen-ion concentration of the samples was pH 6.6 and 6.7 respectively.—*G. B. Rigg.*

4308. Bailey, D. L. **Investigations on Puccinia Helianthi Schw.** [Abstract.] Phytopathology 12: 44. 1922.

4309. Barker, B. T. P., C. T. Gimingham, and S. P. Wiltshire. **Sulphur as a fungicide.** Jour. Bath and West and Southern Counties Soc. 14: 144–162. 1920.—The following fungi, *Nectria ditissima*, *Rhizopus niger*, *Sclerotinia fructigena*, *Phragmidium sub-corticum*, *Fusicladium dendriticum*, *F. pyrinum*, *Cladosporium fulvum*, *Botrytis cinerea*, *Verticillium* sp., *Alternaria* sp., *Pyronema* sp., *Cladosporium herbarum*, and *Erysiphe graminis*, were used in the experiments. Some variation was found in the sensitiveness of these fungi to the toxic effect of sulphur. The toxicity of the sulphide and poly–sulphide constituents of lime sulphur sprays gradually decreases with deposition of sulphur, to which the sprays owe their more permanent fungicidal value. Although actual contact between the spores of fungi and the sulphur "is not necessary to bring about inhibition, no action will take place unless the sulphur comes within a certain minimum radius of action." Volatilized sulphur is toxic to *Erysiphe graminis*.—*J. I. Lauritzen.*

4310. Barrus, Mortier F. **Bean anthracnose.** Cornell Agric. Exp. Sta. Mem. 42. *97–215. Pl. 1–8, fig. 10–20.* 1921.—Bean anthracnose, caused by the fungous pathogene *Colletotrichum lindemuthianum* (Sacc. & Magn.) Bri. & Cav., attacks practically all varieties of *Phaseolus vulgaris* L., a few related species of the same genus, and several species of *Vigna* and *Dolichos*. The history, geographical distribution, and economic importance of the disease are discussed. The symptoms on the seed, seedlings, leaves, stems, roots, and pods are described in full. Colored illustrations of the anthracnose together with other pod diseases of the bean are given.—The spores of the fungus germinate readily on various media at ordinary room temperature. When the germ tube comes in contact with a solid substratum an appressorium is formed. The pathogene grows well in culture, producing a dark mycelial growth and acervuli with flesh-colored masses of spores. Cultures lose their power of fructification due to age or exposure to high temperatures. The minimum temperature for growth lies between 0 and 4°C., the optimum near 22°C., and the maximum at approximately 34°C. The incubation period of the fungus is 4½–7 days, varying with temperature and varieties of the host. The hyphae penetrating the host tissue cause the cells to collapse. In these dead host cells a stroma is formed from which arise conidiophores bearing conidia. The pathogene may live 1–2 years in lesions on pods and stems. Spores washed into the soil die within several weeks. The fungus in the seed may live as long as 2 years under favorable conditions. Seedlings and young pods appear to be most susceptible to the disease. There are at least 2 biologic forms of the pathogene, known as *alpha* and *beta*. Varieties of beans may be placed into 4 groups according to their susceptibility to these 2 forms of the fungus; those resistant to both forms, those susceptible to both, those resistant to *alpha* only, and those resistant to *beta* only. Varieties of *Phaseolus vulgaris* were not susceptible to a number of fungi causing anthracnose on other plants when inoculation experiments were made with them.—In control experiments it was found that seed from clean pods gave plants free from the disease. Western-grown seed gave crops free from the anthracnose, but other seed-carried diseases were severe. Spraying throughout the season with Bordeaux mixture held the disease in check when it was present. Lime-sulphur solution was not so efficient. The use of anthracnose-resistant varieties is considered the most satisfactory means of control.—*W. H. Burkholder.*

4311. Bensuade, M., and G. W. Keitt. **A preliminary report on cross-inoculation experiments with strains of Cladosporium from stone fruits.** [Abstract.] Phytopathology 12: 46. 1922.

4312. Branstetter, B. B. **Treatment of seed to control root and stalk rots.** [Abstract.] Phytopathology 12: 30. 1922.

4313. Brereton, W. LeGay, H. G. White, and C. O. Hamblin. **Downy mildew of the vine. Some experiments.** Agric. Gaz. New South Wales 33: 349–354. *1 fig.* 1922.—In 1920 trials with a proprietary "Bordeaux mixture powder" were found ineffective against downy mildew (*Plasmopara viticola*) when applied dry. The powder, when sprayed on with water, was found as effective as the home-made Bordeaux. In the 1921 trials the home-made Bordeaux was more efficient than either an imported Bordeaux mixture powder or a Bordeaux paste, both of them sprayed on. Sulphuric acid sprays were tried but were without effect. At Yanco, downy mildew and black spot were kept under control by Bordeaux and Burgundy mixtures, the latter being made up with common washing soda (sodium carbonate), instead of lime, in the ratio 4–6–50.—*L. R. Waldron.*

4314. Brooks, Charles, and J. S. Cooley. **Temperature relations of stone fruit fungi.** Jour. Agric. Res. 22: 451–465. *Fig. 1–24.* 1921 [1922].—Results are presented of the temperature responses of *Sclerotinia cinerea* and *Rhizopus nigricans* under various conditions of growth, especially of growth in pure culture on ripe fruits of peach. The details appear in the figures, most of which are graphs.—At 10°C., lesions resulting from inoculation with *Sclerotinia* are retarded 2 days and those from inoculation with *Rhizopus* are retarded 3 days, with corresponding lengthening of incubation period at lower temperatures.—If inoculated peaches are stored at once, after inoculation, at a temperature of 10°C. the incubation period is 3–5 days longer than if the fruits are held after inoculation for 24 hours at 25°C. and then stored at 10°C.—*D. Reddick.*

4315. Brooks, Charles, and D. F. Fisher. **Transportation rots of stone fruits as influenced by orchard spraying.** Jour. Agric. Res. 22: 467–477. 1921 [1922].—The results of 5 years' experimentation are reported. Several varieties of sweet cherries and of green prunes were included in the trials. Untreated cherry trees showed less than 1 per cent of brown rot (*Sclerotinia cinerea*) at harvest but after transportation and storage untreated fruit showed 24.3 per cent brown rot whereas treated fruit showed only 6.4 per cent.—In similar experiments with Italian prunes, untreated fruit showed 4.6 per cent brown rot at picking time, contrasted with 1.6 per cent on treated fruit. After shipment and storage the average percentage of brown rot in the untreated fruit was 28 and in treated fruit only 7.1.—The orchard treatment made 3–4 weeks before harvest has been the most important so far as the shipping tests are concerned. Dusting with sulphur has given results as satisfactory as spraying with standard spray materials. Orchard treatment does not affect the development of rots caused by *Penicillium expansum* or *Rhizopus nigricans*. Bruises and skin punctures seem to be of greater importance in the development of these rots.—Untreated or injured fruit requires lower temperature in transit than treated or uninjured fruit in order to keep as well in storage. —"There is a widely distributed responsibility for the occurrence of stone fruit rots in transit and in storage."—*D. Reddick.*

4316. Burger, O. F. **Peronospora disease of tobacco.** Florida State Plant Bd. Quart. Bull. 5: 163–167. *1 fig.* 1921.—During the latter part of March and the beginning of April *Peronospora Hyoscyanii* De Bary was noticed for the first time in Florida (Gadsden County). The disease may have been introduced from Sumatra. Large spots, 0.5–1 inch in diameter, develop on the leaves. At first these are yellowish green; later they have a water-soaked appearance; and finally they become brown and papery. Soon the brown spots drop out, leaving a hole in the leaf. Plants grown under slats and cheese cloth were infected most, slat-shade plants less, and sun grown tobacco least.—It is believed that spraying the seedbeds with 2–2–50 Bordeaux mixture may control the disease. It is impracticable to spray plants which have attained a height of 18–24 inches. The disease is confined to the sand leaves and the loss is probably not more than 1 per cent of the crop.—*J. C. Th. Uphof.*

4317. Campanile, G. **Su di una malattia delle frutta di mandarino. [On a disease of the fruit of mandarin.]** Mem. R. Staz. Patol. Veg. Roma 55: 5–12 *Fig. 1–4.* 1922.—The author describes a condition found on fruit in the market which could be reproduced by artificial inoculation. The term "disease" is used in its broad interpretation, as no fruit was obtained from trees during the growing period, but only after preparation for the market. The special lesions are due to *Cytosporina citriperda* Campanile, which the author describes as a new species. The author expresses herself definitely with regard to the difference between this disease and the conditions induced by *Phomopsis Citri* Fawcett, *Alternaria tenuis* form. *chalaroides* Sacc., *Phoma citricarpa* MacAlp. and the *Septoria glaucescens* of Guillochon.—*A. Bonazzi.*

4318. Chifflot, J. **Les maladies cryptogamiques des abricotiers dans la Vallée du Rhône.** [Fungous diseases of apricots in the Rhone Valley.] Ann. Epiphyties 7: 315–322. 1921.—Apricots in the Rhone Valley are especially attacked by the 2 following parasites: *Stromatinia* (*Sclerotinia*) *laxa* Ehrenb. (*Monilia laxa* (Ehrenb.) Sacc. & Vogl.), which is certainly only a form of *Stromatinia* (*Monilia*) *cinerea* Bon., and *Clasterosporium carpophilum* (Lev.) Aderh. (*Coryneum Beijerinckii* Oud.).—The Stromatinia attacks flowers, buds, fruits, and branches. The grey mold of the conidial stage (*Monilia*) is observed also at the base of the petioles and on scars left by fallen buds and flowers. Gummy secretions are emitted through the broken cuticle, sometimes copiously. Humid weather favors the development and dissemination of the parasite, which grows at low temperatures. Infection probably takes place through the stigma as soon as the flowers open. In this way the branches and in turn the fruits are invaded.—*Clasterosporium carpophilum* causes less severe injury: it attacks flowers, branches, and fruits.—The same control measures are advised for both diseases: burning ripe fruits and dead wood. In winter Bordeaux or Burgundy mixture and neutral copper acetate should be used, with several applications (January, February) just before and after blossoming. Scott's lime-sulphur mixture is efficacious and easy to prepare.—In degree of resistance, Luizet is at the top of the scale, followed in decreasing order by Abricot d'Ampuis, Blanc Rose, Pavrot, and Poizat.—*E. Foëx.*

4319. Clayton, Edward E. **Diplodia Zeae as an ear and root parasite of corn.** [Abstract.] Phytopathology **12**: 29. 1922.

4320. Cook, Mel. T. **A new disease of asparagus.** [Abstract.] Phytopathology **12**: 49. 1922.—The disease is caused by *Fusarium* sp.—*B. B. Higgins.*

4321. Cook, Mel. T., and R. F. Poole. **Stem rot disease of sweet potatoes in New Jersey.** [Abstract.] Phytopathology **12**: 51. 1922.—The disease is caused by *Fusarium hyperoxysporium* Wollenw. and *F. batatatis* Wollenw.—*B. B. Higgins.*

4322. Coons, G. H., and Ray Nelson. **First progress report on "yellows" resistant Golden Self-blanching celery.** [Abstract.] Phytopathology **12**: 48. 1922.—The disease is caused by *Fusarium* sp.—*B. B. Higgins.*

4323. Cunningham, G. H. **A fungus disease attacking blackberry.** New Zealand Jour. Agric. **24**: 23–26. 1922.—*Leptosphaeria coniothyrium* (Fcl.) Sacc. was found quite generally distributed on blackberries in the northern part of North Island.—*N. J. Giddings.*

4324. Detmers, Freda. **A preliminary report on a serious twig blight of American elm.** [Abstract.] Phytopathology **12**: 47. 1922.—The disease is caused by *Poronidulus conchifer* (Schw.) Murrill.—*B. B. Higgins.*

4325. Detwiler, S. B. **White pine blister rust quarantine.** Monthly Bull. California Dept. Agric. **10**: 265–271. 1921.—The disease can not be eradicated and the only means of protection is quarantining against free territories. All of the eastern states are affected. The Pacific slope should be protected by quarantining. Spores are produced on the pine and the radius of infection is about 200–300 feet.—*E. L. Overholser.*

4326. Drechsler, Charles. **A new leaf spot of Kentucky Blue Grass caused by an undescribed species of Helminthosporium.** [Abstract.] Phytopathology **12**: 35. 1922.

4327. Drechsler, Charles. **Net blotch of meadow fescue caused by an undescribed species of Helminthosporium.** [Abstract.] Phytopathology 12: 35. 1922.

4328. Durrell, L. W. **Diplodia of corn in Iowa.** [Abstract.] Phytopathology 12: 29. 1922.—The disease is caused by *Diplodia Zeae* Lév.—*B. B. Higgins.*

4329. Dye, H. W. **The bottom-rot disease of western New York lettuce.** [Abstract.] Phytopathology 12: 48. 1922.—The disease is caused by *Rhizoctonia.*—*B. B. Higgins.*

4330. Edgerton, C. W. **Onion diseases and onion seed production.** Louisiana Agric. Exp. Sta. Bull. 182. *20 p., 9 fig.* 1921.—About 50 per cent of the onion seed crop is lost by diseases in southern Louisiana. The principal disease, the black stalk rot, is caused by *Macrosporium parasiticum* Thuem. The stems become black and finally fall over. The black stalk rot often follows the mildew and a white spot disease but the 2 latter troubles are not necessary for a severe infection of the former. Besides the above diseases, anthracnose, *Colletotrichum circinans* (Berk.) Vogl., pink root disease, *Fusarium Mallii* Taub., and a *Fusarium* root rot are often found on onions in Louisiana.—Spraying with fungicides at weekly intervals did not give a satisfactory control of the black stalk rot. The latter is much more severe along the lower coast where the humidity is high than it is farther north in the state.—*C. W. Edgerton.*

4331. Edgerton, C. W., and C. C. Moreland. **Tests of the wilt resistance of different tomato varieties.** Louisiana Agric. Exp. Sta. Bull. 184. *24 p., 8 fig.* 1921.—The results of 3 years' tests show the superiority of certain wilt-resistant strains of tomatoes in localities badly infested with the tomato wilt disease (*Fusarium Lycopersici* Sacc.). The disease attacks all varieties but does not kill the resistant plants as quickly as it does the susceptible ones. Most of the ordinary commercial varieties are susceptible. The varieties selected at the Louisiana Experiment Station have given the best results in Louisiana.—*C. W. Edgerton.*

4332. Elliott, John A. **Cotton wilt a seed-borne disease.** [Abstract.] Phytopathology 12: 50-51. 1922.—The disease is caused by *Fusarium vasinfectum* Atkins.—*B. B. Higgins.*

4333. Evans, Nevada S. **"Black point" of wheat.** Phytopathology 11: 515. 1921. [Also Abst. in Phytopathology 12: 34. 1922.]—A large percentage of the kernels of durum wheats grown in the Upper Mississippi Valley show more or less discoloration, especially at the embryo end. Isolations and limited inoculation experiments indicate that the discoloration is due to a species of *Helminthosporium*, probably *H. sativum* P. K. & B.—*B. B. Higgins.*

4334. Fawcett, H. S. **A Phomopsis of citrus in California.** [Abstract.] Phytopathology 12: 107. 1922.

4335. Fisher, D. F. **An outbreak of powdery mildew (Podosphaera leucotricha) on pear.** Abstract.] Phytopathology 12: 103. 1922.

4336. Fitzpatrick, H. M., H. E. Thomas, and R. S. Kirby. **Ophiobolus cariceti (Berk. & Br.) Sacc., cause of take-all of wheat.** [Abstract.] Phytopathology 12: 27. 1922.

4337. Fromme, F. D. **Incidence of loose-smut in wheat.** Phytopathology 11: 507-510. 1921.—Observations during recent years have shown that fields of the wheat variety Leap Prolific in Virginia are practically free from loose smut (*Ustilago Tritici*), while fields of other varieties in the same regions are heavily infested. Whether this is a case of true resistance or a case of disease escape has not yet been determined.—*B. B. Higgins.*

4338. Fromme, F. D. **Susceptibility of apple root-stocks to black root rot.** [Abstract.] Phytopathology 12: 54-55. 1922.—The disease is caused by *Xylaria digitata?*—*B. B. Higgins.*

4339. Gard, M. **L'apoplexie de la vigne et les formes résupinées du Fomes igniarius (L.) Fr.** [The "esca" disease of the grape and fruiting bodies of Phellinus (Fomes) igniarius.] Bull. Soc. Path. Vég. France 9: 22–28. *Fig. 1–2.* 1922.—The fungus oxidizes the wood tannin, rots the wood, and develops carpophores on the withered stems. The new variety *Fomes igniarius* var. *viticidus* is described.—*J. Dufrenoy.*

4340. Gard, M. **L'Hydnum erinaceus sur noyers.** [Hydnum erinaceus on Juglans.] Bull. Soc. Path. Vég. France 9: 21. 1922.—The first occurrence of the fungus on this host is reported.—*Edith K. Cash.*

4341. Gardner, Max W. **Origin of apple-blotch cankers.** [Abstract.] Phytopathology 12: 55. 1922.—The disease is caused by *Phyllosticta solitaria* E. & E.—*B. B. Higgins.*

4342. Gimingham, C. T., and G. T. Spinks. **Rhizoctonia on carrots.** Jour. Bath and West and Southern Counties Soc. 14: 130–132. 1920.—Experiments were conducted to determine the influence of bleaching powder on the control of the disease. The results were negative because the disease did not appear, but the treatment of the soil with 2 ounces per square yard, which previously has been shown to control the disease, permitted the normal growth of the crop.—*J. I. Lauritzen.*

4343. Gimingham, C. T., and G. T. Spinks. **Soil sterilization.** Jour. Bath and West and Southern Counties Soc. 14: 126–130. 1920.—Pots of soil infested with *Synchitrium endobioticum* (Schilb.) Perc. were treated with the following substances: bleaching powder, creosote, chloro-picrin, formalin, powdered chalk, Cymène, and steam, before Irish potato tubers were planted in the pots, and with copper sulphate, sulphur dioxide, formalin, and bleaching powder after the tubers were planted. Steam sterilization alone prevented infection.—*J. I. Lauritzen.*

4344. Haenseler, C. M. **A new peach wilt disease.** [Abstract.] Phytopathology 12: 56–57. 1922.—The disease is caused by *Verticillium* sp., resembling *V. albo-atrum* Reinke & Bert.—*B. B. Higgins.*

4345. Hamblin, C. O. **Control of "collar rot" of citrus trees. Some orchard experiments.** Agric. Gaz. New South Wales 33: 294–296. *1 fig.* 1922.—Collar rot of citrus trees is manifested by gummosis on the trunk just above or close to the ground. A Fusarium is found in constant association. Its inception is through traumatism or water-logged bark. Diseased trees selected for treatment had the diseased tissue carefully excised and applications made of "bluestone paste." Other trees, with similarly excised diseased tissue, were painted with "bluestone paint." Treatment was evidently of value and recovery came about in those trees where the diseased tissue was sufficiently removed.—*L. R. Waldron.*

4346. Harter, L. L., and J. L. Weimer. **Susceptibility of the different varieties of sweet potatoes to decay by Rhizopus nigricans and Rhizopus Tritici.** Jour. Agric. Res. 22: 511–515. 1921 [1922].—The following varieties of sweet potato (*Ipomoea batatas*) are very susceptible to *Rhizopus nigricans* when artificially inoculated and stored at 20–22°C.: Gold Skin, Little Stem Jersey, Georgia, Early Carolina, Red Brazil, Haiti, Yellow Belmont, and Dooley. The following are very resistant: Southern Queen and Nancy Hall. The following varieties are intermediate: Porto Rico, Big Stem Jersey, Triumph, Pierson, Florida, and Dahomey.—*Rhizopus Tritici* was tested on the same varieties, excepting Early Carolina, Florida, Red Brazil, and Yellow Belmont, and at its optimum growth temperature, 30°C. The susceptibility of the varieties to *R. Tritici* is the same as for *R. nigricans* but the 2 resistant varieties are more susceptible to decay by the former than by the latter even at the optimum growth condition (20–22°C.) of the latter species.—*D. Reddick.*

4347. Harter, L. L., and J. L. Weimer. **The decay of various vegetables and fruits by different species of Rhizopus.** [Abstract.] Phytopathology 12: 50. 1922.

4348. Haskell, R. J. **Phytophthora infestans on eggplant in the United States.** Phytopathology 11: 504–505. 1921.—During the summer of 1915 *Phytophthora infestans* was found producing lesions on the peduncles and the calyces, and causing decay of young fruits of the eggplant (*Solanum melongena* L.). The eggplants were growing in a field of Irish potatoes badly infested with this fungus.—*B. B. Higgins.*

4349. Hoerner, G. R. **Data relative to the germination of aeciospores, urediniospores and teliospores of Puccinia coronata Cda.** [Abstract.] Phytopathology 12: 108. 1922.

4350. Hoerner, G. R. **Infection capabilities of crown rust of oats.** Phytopathology 12: 4–15. 1922. [Also Abst. in Phytopathology 12: 33–34. 1922.]—Inoculations with urediniospores of crown rust (*Puccinia coronata* Cda.), from various sources, were made on *Avena sativa, Hordeum vulgare, Secale cereale, Triticum compactum, T. vulgare,* and on 52 species of wild and cultivated grasses for the purpose of determining the host range and also the possibility of variations in the fungus from localities where particular varieties of oats are grown. The results indicate a much wider range of hosts than that usually given. Some variation was found in the infection capabilities of the different specimens; but the number of inoculations was not sufficient to justify conclusions.—*B. B. Higgins.*

4351. Hoerner, G. R. **Miscellaneous studies with the crown rust of oats.** [Abstract.] Phytopathology 12: 108. 1922.

4352. Hopkins, Edwin F. **The botrytis blight of tulips.** Cornell Agric. Exp. Sta. Mem. 45. *311–361. Pl. 33 (colored), fig. 22–50.* 1921.—Botrytis blight is proposed as the name for a disease which is confined to members of the genus *Tulipa.* It is the most prevalent and most destructive disease of tulips in the U. S. A. Lesions occur on the bulb, leaf, stem, and flower. The disease is caused by *Botrytis Tulipae* (Libert) comb. nov.(*Botrytis parastitica Cav.*).—The morphology and physiology of the fungus is presented in detail, also the morbid anatomy and physiology of the host.—Conidial production occurs abundantly in plate cultures that are allowed to dry. The infection experiments which are reported show that the organism is a restricted parasite.—The most likely method of control seems to lie in the elimination of bulbs that bear lesions or sclerotia, followed by such sanitary measures as may be necessary.—The treatment is monographic, with a review of previous work and an extensive bibliography. —*D. Reddick.*

4353. Horne, W. T. **A Phomopsis from the Isle of Pines.** [Abstract.] Phytopathology 12: 105. 1922.—The fungus occurs on grapefruit.—*B. B. Higgins.*

4354. Hostermann, G., und R. Laubert. **Eine bösartige neue Pilzkrankheit der Nelke. [A dangerous new fungous disease of the carnation.]** Gartenwelt 25: 65–67. 1921.—On both sides of the leaves develop large spots, at first brown, then light gray when dry, 1–3 cm. long. Spotted leaves wither and appear to be half broken off. Similar discolored spots occur on the stem, flower stalks, and calyx. The parenchyma is shriveled up, being filled by interwoven, colored, septate hyphae, which form a plectenchyma layer in the outer portion of the epidermal cells beneath the cuticle, where there develops a colorless, disk-like group of conidia varying in size up to 0.3 mm.—The newly discovered disease is caused by **Pseudodiscosia Dianthi** nov. gen. et sp. of the family Melanconiaceae. Neither sulphur nor 1–2 per cent Bordeaux mixture was successful in combating the disease.—*J. C. Th. Uphof.*

4355. Howitt, J. E., and R. E. Stone. **Experiments with Haskell's method or the so-called dry formaldehyde treatment for the prevention of oat smut.** [Abstract.] Phytopathology 12: 35–36. 1922.

4356. Janchen, Erwin. **Die Krebswiderstandsfähigkeit der in Oesterreich gebauten Kartoffelsorten. [The wart resistance of the potato varieties cultivated in Austria.]** Oesterreich. Zeitschr. Kartoffelbau 2: 11–12. 1922.—Two tables, compiled from correspondence and from actual survey, are given to show the reaction to wart disease of the varieties in general use. The larger proportion of varieties are susceptible, and only small stocks of immunes exist.—*F. Weiss.*

4357. Johnsen, J. **Bønnesygen Gloeosporium lindemuthianum.** [Bean anthracnose.] Gartner-Tidende 1922: 81–83. 1922.—One year's experiments with 1- and 2-year old seed point toward the use of old seed as a means of increasing the yield and the percentage of healthy pods.—*Ernst Gram.*

4358. Jones, Edith Seymour. **Relation of temperature, soil moisture, and oxygen to the germination of the spore of Ustilago Avenae.** [Abstract.] Phytopathology 12: 45. 1922.

4359. Jones, Fred Reuel, and R. E. Vaughan. **Anthracnose of the garden pea.** Phytopathology 11: 500–503. *Pl. 25.* 1921.—The occurrence of *Colletotrichum Pisi* Pat. on garden peas is reported from 2 localities in Wisconsin, where it has produced considerable damage. Lesions are produced on leaves, stems, and seed pods. Inoculations on various plants indicate that the host range of the fungus is confined to the genus *Pisum.*—*B. B. Higgins.*

4360. Jones, Leon K. **A preliminary report on the control of raspberry anthracnose.** [Abstract.] Phytopathology 12: 57–58. 1922.—The disease is due to *Gloeosporium venetum* Speg.—*B. B. Higgins.*

4361. Kay, James. **Treatment of forest seedbeds with disinfectants to prevent damping off.** Trans. Roy. Scottish Arbor. Soc. 35: 70–72. 1921.—The methods of treating heavy soils and sandy soils are enumerated. Ordinary commercial sulphuric acid appears the cheapest and most effective preventive of damping-off. In all disinfection by chemicals the quantity of the disinfectant used per unit area of soil surface seems to be the important variable.—*C. R. Tillotson.*

4362. Keitt, G. W. **Third progress report on apple scab and its control in Wisconsin.** [Abstract.] Phytopathology 12: 54. 1922.—The disease is caused by *Venturia inaequalis* (Cke.) Aderh.—*B. B. Higgins.*

4363. Kempton, F. E. **Progress of the barberry eradication campaign.** [Abstract.] Phytopathology 12: 33. 1922.

4364. Kirby, R. S. **The take-all disease of cereals and grasses.** Phytopathology 12: 66–88. *Pl. 2–4, fig. 1–3.* 1922. [Also Abst. in Phytopathology 12: 27. 1922.]—A survey of the wheat fields in 36 counties of New York during 1921 revealed the presence of "take-all" (*Ophiobolus cariceti* (B. & Br.) Sacc.) in 78 fields located in 16 middle-western counties. The damage in these fields was estimated at 2 per cent. Infected plants were characterized by marked dwarfing and by reduction of number of tillers, heads per plant, and grains per head. The fungus was confined to the roots and lower internodes of the culm. A typical mat of brown mycelium was usually found between the leaf sheath and the culm. Perithecia were produced on the culm; they seemed to mature their spores in the fall, though immature spores were sometimes found in June. Several cultures were obtained from isolated ascospores; and inoculations with these cultures, under controlled conditions, produced a disease with all the symptoms noted in the field. To determine the host range, 62 varieties of cereals and 48 species of wild grasses were inoculated in the greenhouse. None of the 44 varieties of wheat showed any marked resistance in this test. Infection was also produced on rye and barley, and on 1 or more species of each of the following genera of grasses: *Agropyron, Bromus, Elymus, Festuca, Hordeum, Hystrix, Lolium,* and *Phalaris.* No infection was produced on oats or corn, or on several species of wild grasses. Infected stubble was found to be the most important carrier of the disease. Practice of a long rotation was therefore recommended as a control measure.—*B. B. Higgins.*

4365. Köck, Gustav. **Das Verhalten der oesterreichischen Kartoffel-Landsorten gegen den Krebserreger.** [Reaction of Austrian domestic potato varieties to the wart disease pathogen.] Oesterreich. Zeitschr. Kartoffelbau 2: 10–11. 1922.—To be prepared against the eventuality of spread of wart disease into Austria, adaptation tests of the German immune varieties Jubel and Ideal have been made. The Austrian varieties Zborower, Praller, Romaner, Wolkersdorfer, Blaue Riesen, and Magnum Bonum have been found to be susceptible. Jubel is the only well adapted immune variety of which good seed stock is on hand.—*F. Weiss.*

4366. Kühl, Hugo. **Kolloidaler Schwefel zur Bekämpfung der Erysiphaceen.** [Colloidal sulphur for combatting Erysiphaceae.] Gartenwelt 24: 16–18. 1920.—The measurement of particles of powdered and sublimated sulphur is done by the sulfurimeter of Chancel, but can not be used for colloidal sulphur which is in the gel form. Colloidal sulphur is sprayed on the leaves in suspension in water. Concentrations of 1:100, 0.6:100, and 0.2:100 proved effective on grapes attacked by *Oidium Tuckeri* Berk., whereas a concentration of 0.5:1000 showed no effect. The latter concentration proved successful against rose mildew, *Sphaerotheca pannosa* (Wallr.) Lév.; had no effect on *Merulius lacrymans* (Jcq.) Fr.; and was successful against *Sphaerotheca morsuvae* (Schw.) B. & C. on gooseberries if used twice. Sulphur in de Haen gel form can be spread very finely over the plants and will not be washed off. Its action is stronger than that of other sulphur, but is more likely to burn the leaves.—*J. C. Th. Uphof.*

4367. Lambert, E. B., and D. L. Bailey. **Results of treating seed of spring wheat and oats with copper carbonate dust to prevent smut.** [Abstract.] Phytopathology **12:** 36. 1922.

4368. La Rue, Carl D. **Helminthosporium Heveae Petch, in Sumatra.** [Abstract.] Phytopathology **12:** 60. 1922.

4369. Laubert, R. **Bemerkungen über die Rostempfänglichkeit der Rosen.** [Notes on rust susceptibility of roses.] Gartenwelt 24: 56–58. 1920.—A list of 230 varieties and hybrids of roses is given noting resistance and susceptibility to rust.—*J. C. Th. Uphof.*

4370. Laubert, R. **Die Platanenkrankheit.** [The sycamore disease.] Gartenwelt 24: 357–360. *4 fig.* 1920.—A description of the most destructive disease of *Platanus*, caused by *Gloeosporium nervisequum* (Fuck.) Sacc., is given.—*J. C. Th. Uphof.*

4371. Lauritzen, J. I., and L. L. Harter. **The species of Rhizopus responsible for the decay of sweet potatoes under storage conditions.** [Abstract.] Phytopathology **12:** 51. 1922.—The decay is caused in the main by *R. Tritici* Saito and *R. nigricans* Ehr.—*B. B. Higgins.*

4372. Lee, H. Atherton. **Banana freckle in the Philippine Islands.** Phytopathology **12:** 101–102. 1922.—A black-spotting or "freckle" is reported as of general occurrence on native Philippine varieties of bananas (*Musa sapientum* L.). The disease is apparently indigenous and seems to be the same as that described by Carpenter as caused by *Phoma Musae* Carpenter.—*B. B. Higgins.*

4373. Link, Geo. K. K. **Downy mildew: A transit disease of lettuce.** [Abstract.] Phytopathology **12:** 48–49. 1922.—The disease is caused by *Bremia Lactucae* Regel.—*B. B. Higgins.*

4374. Link, Geo. K. K. **Leak, a serious transit disease of potatoes.** [Abstract.] Phytopathology **12:** 38. 1922.—The disease is caused by *Pythium*-like fungi.—*B. B. Higgins.*

4375. McKinney, H. H. **The Helminthosporium disease of wheat and the influence of soil temperature on seedling infection.** [Abstract.] Phytopathology **12:** 28. 1922.—The disease is caused by *Helminthosporium gramineum* Rabh.—*B. B. Higgins.*

4376. McKinney, H. H., and A. G. Johnson. **Wojnowicia graminis (McAlp.) Sacc. and D. Sacc. on wheat in the United States.** Phytopathology **11**: 505–506. 1921.—The pycnidia of this fungus have been found on the leaf sheaths of wheat plants, showing symptoms similar to the true take-all of Europe, in various localities of the U. S. A. In 1 lot of specimens the perithecia of *Ophiobolus graminis* Sacc. were found on the same plants; but growth in comparative cultures from the 2 spore forms indicate that there is probably no genetic connection between the two.—*B. B. Higgins.*

4377. McKinney, H. H., and L. E. Melchers. **Foot-rot disease of wheat in Kansas.** [Abstract.] Phytopathology **12**: 27–28. 1922.

4378. Mains, E. B., and C. E. Leighty. **Rye resistant to leaf rust, Puccinia dispersa.** [Abstract.] Phytopathology **12**: 33. 1922.

4379. Manaresi, Angelo. **L'oidio della quercia sul castagno. [The oak mildew on chestnut.]** Staz. Sper. Agrarie Ital. **54**: 289–292. 1921.—One-year seedlings of chestnut were found attacked by *Oidium quercinum* Thümen with a mortality of 0.5 per cent.—*A. Bonazzi.*

4380. Martin, Wm. H. **Further experiments with inoculated and uninoculated sulfur for the control of potato scab.** [Abstract.] Phytopathology **12**: 38–39. 1922.

4381. Massey, L. M. **Fusarium rot of Gladiolus.** [Abstract.] Phytopathology **12**: 53. 1922.

4382. Meier, Fred, Charles Drechsler, and Emery Eddy. **Cucumber black rot caused by Mycosphaerella citrullina.** [Abstract.] Phytopathology **12**: 43. 1922.

4383. Meier, Fred, Charles Drechsler, and Emery Eddy. **Storage rot of carrots caused by a species of Alternaria.** [Abstract.] Phytopathology **12**: 49. 1922.

4384. Morettini, A. **Sulla efficacia dei trattamenti polverulenti contro la "carie" del frumento. [The value of powder treatment of seed wheat for stinking smut.]** Staz. Sper. Agrarie Ital. **54**: 293–315. 1921.—A comparison is made of copper sulphate, copper carbonate, and "caffaro" powder.—*A. Bonazzi.*

4385. Munerati, O. **Osservazioni sulla recettività del frumento per la carie. [Observations on the susceptibility of wheat to bunt.]** Atti R. Accad. Lincei Rend. Cl. Sci. Fis. Mat. e Nat. **31**[1]: 125–129. 1922.—When wheat covered with bunt spores was germinated at temperatures of 7–8°C. a high percentage of infection developed in contrast to a low percentage at temperatures of 18–20°C. When spores were attached to the wheat kernel in the region of the embryo a higher percentage of infection developed when the wheat was planted than when the spores were attached elsewhere.—*F. M. Blodgett.*

4386. Ocfemia, G. O. **The sesame spot disease of rice.** [Abstract.] Phytopathology **12**: 34. 1922.—The disease is caused by *Helminthosporium* spp.—*B. B. Higgins.*

4387. Parker, Chas. S. **Head smut of corn in Washington.** Phytopathology **11**: 515. 1921.

4388. Peltier, George L., and Wm. J. Frederich. **Relative susceptibility of citrus plants to Cladosporium Citri Massee.** [Abstract.] Phytopathology **12**: 57. 1922.

4389. Peltier, George L., and Wm. J. Frederich. **Weather and its relation to citrus scab epidemics in Alabama.** [Abstract.] Phytopathology **12**: 57. 1922.—The disease is caused by *Cladosporium Citri* Massee.—*B. B. Higgins.*

4390. Pennington, L. H. **The effect of Cronartium ribicola upon Ribes.** [Abstract.] Phytopathology 12: 45. 1922.

4391. Pereira, E. de Braganca. **Sclerotium disease of rice.** Philippine Agric. 10: 331–345. 1922.—Studies were made of a rather serious disease of rice seedlings in the Philippines caused by an undetermined species of *Sclerotium*. To reduce infection, close planting should be avoided, and the paddies should be kept flooded with water.—*Sam. F. Trelease.*

4392. Peyronel, Beniamino. **Una grave malottia del mandorlo, prodotta dal Fusicladium Amygdali Ducomet. [A serious disease of almond produced by Fusicladium Amygdali.]** Nuovi Ann. Ministero Agric. [Roma] 1: 27–44. *Fig. 1–7.* 1921.—*Fusicladium Amygdali* Ducomet was described in 1910 as causing apparently only slight injury to leaves and branches of almond trees in France. The same disease has recently been observed in the vicinity of Rome where the damage produced appears to be much more serious. Young trees attacked by the parasite are nearly completely defoliated by autumn, and many twigs withered. The few flowers and young fruits formed are sickly and drop. Young trees with succulent branches and those growing in the shade seem most susceptible to attack.—Leaf spots are formed at first only on the lower surface; they are olivaceous, velvety, rather definitely margined, round or subpolygonal, becoming more or less confluent and covering nearly all of the surface, at length showing the conidia of the fungus as an olivaceous bloom, and finally falling away as in the shot-hole produced by *Clasterosporium carpophilum* (Lév.) Aderh. On leaves of the older, woody branches the spots are frequently more numerous, smaller, and less often confluent.—Round or elongated, raised, crust-like spots also appear on the branches, sometimes covering a large part of the surface, varying in color from reddish to brown and bearing the olivaceous conidia.—The mycelium is at first subcuticular, confined to the membrane of the epidermal cells, invading the subepidermal tissue after the leaf dies and finally penetrating to the upper side of the leaf where the conidia develop. On the branches a layer of cork cells develops beneath the epidermis. The fungus, which is described in some detail, is morphologically so nearly identical with *Fusicladium cerasi* (Rabenh.) Sacc. and *F. Pruni* Ducomet that the specific distinctions are considered of little value by the writer. Artificial inoculations may aid in determining this point.—No control experiments have been attempted but it is probable that the measures now in use for controlling the other Fusicladium diseases of fruit trees would be effective.—*Edith K. Cash.*

4393. Phillips, Edith H. **Some fig diseases.** [Abstract.] Phytopathology 12: 107. 1922.—*Aspergillus* sp., *Sclerotinia libertiana*, and *Botrytis* sp. are given as causal agents.—*B. B. Higgins.*

4394. Poole, R. F. **Some recent investigations on the control of Sclerotinia libertiana in the greenhouse on the muck farms of Bergen County New Jersey.** Phytopathology 12: 16–20. *Fig. 1–3.* 1922.—For several years the attacks of *S. libertiana* on greenhouse-grown celery seedlings have been very destructive. As a control measure it is recommended that fresh soil be brought into the greenhouse and sterilized with formaldehyde.—*B. B. Higgins.*

4395. Povah, Alfred H. W. **Hypoxylon poplar canker.** [Abstract.] Phytopathology 12: 59. 1922.—The disease is caused by *Hypoxylon pruinatum* (Klotsch) Cke.—*B. B. Higgins.*

4396. Raines, M. A. **Vegetative vigor of the host as a factor influencing susceptibility and resistance to certain rust diseases of the higher plants. I.** Amer. Jour. Bot. 9: 183–203. 1922.—The observation has frequently been made that health and vigor of the host favor rather than hinder its infection by a rust. The author presents an extensive review of the literature bearing on the relation between vigor and rust infection, in which the influence of nitrogen nutrition, mineral nutrients, carbon metabolism, water relations, temperature relations, stimulants and depressants, toxic agents, trauma, and age and maturity of host tissue are considered.—The rusts of the cereal grains and related grasses in the vicinity of New York are enumerated. In field experiments, the source and condition of the seed used were found to have no influence on the time of first appearance of the rust, which was apparently due to local environmental conditions.—*E. W. Sinnott.*

4397. Raines, M. A. **Vegetative vigor of the host as a factor influencing susceptibility and resistance to certain rust diseases of the higher plants. II.** Amer. Jour. Bot. 9: 215–238. *2 pl.* 1922.—Field studies of rust infection showed that the age and maturity of the host plant were factors in determining the rate and progress of the disease, and that the action of these factors differed with the identity of the host plant.—Experiments in the greenhouse with corn seedlings showed that a single spore may produce infection and that a dose of over 100 will certainly do so.—There were wide differences between different cultures of rust fungus in the tendency to produce teleutospores, and fungous constitution is perhaps a factor in determining these differences.—In water cultures of corn, incubation period of the rust increased with depression in vigor and rate of growth of host. In soil cultures with oats, where size and vigor of plants were modified by various means, the degree of infection increased with the size of the host plant except in 1 case where the plants were relatively young when inoculated and were exposed a comparatively long time to infection. Where growth of host was depressed, rust pustules decreased in size.—Among the seedlings grown there were apparently constitutional differences in susceptibility to rust infection.—No definite evidence was obtained that different fertilizer treatments caused differences in susceptibility.—The author cites instances of other fungous diseases in which increased vigor of host is followed by increased susceptibility, and discusses the importance of this fact in pathological problems.—*E. W. Sinnott.*

4398. Reinking, Otto A. **Coconut bud rot in the Philippines.** [Abstract.] Phytopathology 12: 46–47. 1922.—The disease is caused by *Phytophthora* sp.—*B. B. Higgins.*

4399. Rose, Jessie P. **A seedling blight caused by Fusarium culmorum var. leteius Sher.** [Abstract.] Phytopathology 12: 28. 1922.

4400. Ross, William A. **Results of dusting and spraying experiments in Ontario.** Crop Protection Digest [Washington, D. C.] Bull. 2. *26–28.* 1922.—Copper-arsenate (Sanders) and 90–10 sulphur arsenate dust gave poor control of apple scab in comparison with lime-sulphur spray. The same dusting materials proved inferior to lime-sulphur and Bordeaux mixture in the control of brown rot of cherries. The best control of leaf spot of sour cherries was obtained with Bordeaux mixture.—*F. D. Fromme.*

4401. Rumbold, Caroline, and Elizabeth Koch Tisdale. **Phoma insidiosa on sorghum.** Phytopathology 11: 513–514. 1921.—A comparison of type material of *Phoma insidiosa* F. Tassi with the fungus on sorghums recently reported under this name in the U. S. A. indicates that they are the same species. What appears to be the same fungus has also been found on seed of various sorghums from China, India, Africa, and from the West Indies.—*B. B. Higgins.*

4402. Schaffnit, E. **Über die geographische Verbreitung von Calonectria graminicola (Berk. & Brom.) Wwr. (Fusarium nival. Caes.) und die Bedeutung der Beize des Roggens zur Bekämpfung des Pilzes. [Geographical distribution of Fusarium nivale and the action of fungicides on infected rye.]** Landw. Jahrb. 54: 523–538. 1919.—The distribution of the Fusarium disease of rye in Prussia and the factors influencing its overwintering and spread are treated in the 1st part of this paper. A map showing the occurrence of the disease and the percentage of infection in different districts as compiled from 5 years' careful observation is appended.—The results of extended tests with various fungicides, including mercuric chloride, formalin, copper sulphate, chinosol, and uspulun on kernels infected with ***Fusarium nivale*** Caes. are given. The success of treatment with various chemicals is influenced very decidedly by the grain used for soaking. The important factors are the degree of *Fusarium* infection, the age, and the vitality of the grain. With heavily infected kernels such concentrated solutions were required for sterilization that the germination and vitality of the plants were severely affected. A preparation called uspulun was the only fungicide which sterilized the kernels without injurious action on germination.—*Lillian C. Cash.*

4403. Shapovalov, Michael. **"Skin spot": a stage of powdery scab.** [Abstract.] Phytopathology **12**: 37–38. 1922.

4404. Shear, C. L. **A new source of supply of pure cultures of fungi.** Phytopathology **12**: 24–25. 1922.—The British Mycological Society has established a center for maintaining and distributing pure cultures of fungi, principally those of economic importance, in charge of the Curator, National Collection of Type Cultures, Lister Institute, Chelsea Gardens, London, S. W.—*B. B. Higgins.*

4405. Sherbakoff, C. D. **Fusaria of wheat and corn.** [Abstract.] Phytopathology **12**: 45. 1922.—*Fusarium graminearum* Schwabe and *F. moniliforme* Sheldon are concerned—*B. B. Higgins.*

4406. Snell, Walter H. **The effect of heat upon the mycelium of certain structural timber destroying fungi within wood.** [Abstract.] Phytopathology **12**: 59. 1922. *Lenzites sepiaria, L. trabea, Trametes serialis, T. carnea,* and *Lentinus lepideus* are embraced in the study.—*B. B. Higgins.*

4407. Spinks, G. T. **Spraying trials.** Jour. Bath and West and Southern Counties Soc. **14**: 134. 1920.—Bordeaux mixture (1 per cent), copper stearate (1 per cent), and possibly Burgundy mixture are equally effective in reducing the amount of scab on apples and pears, while a dormant spray of copper sulphate (1 per cent) is less effective though not without value. Burgundy mixture causes serious injury to fruit and foliage; the other sprays cause no injury.—*J. I. Lauritzen.*

4408. Stakman, E. C., and Olaf S. Aamodt. **The effect of fertilizers on the development of stem rust of wheat.** [Abstract.] Phytopathology **12**: 31. 1922.—The rust concerned is *Puccinia graminis Tritici* Erikss.—*B. B. Higgins.*

4409. Stakman, E. C., A. W. Henry, W. N. Christopher, and G. C. Curran. **Observation of the spore content of the upper air.** [Abstract.] Phytopathology **12**: 44. 1922.

4410. Stephens, D. E., and H. M. Woolman. **The wheat bunt problem in Oregon.** Oregon Agric. Exp. Sta. Bull. 188. *42 p., 5 fig.* 1922.—*Tilletia Tritici* and *T. levis* are both found in the Willamette Valley but the former only east of the Cascade Mountains. In eastern Oregon summer fallowing is almost universal. The fallow fields become infested with the bunt spores by wind dissemination during thrashing season. It is shown that the spores are carried in considerable quantities for 100 miles or more. Infection from this source cannot be controlled by seed treatment or any kind of farm practice that is suitable to the affected localities.—Efforts are being made to obtain by selection and cross breeding suitable varieties that are immune to the disease. Eighteen or more varieties, after repeated tests, have proved sufficiently resistant to be safely sown without treatment. Two of these, Red Hussar C. I. 4843 and Martins Amber C. 1. 4463, appear to be absolutely immune. All are being tested for yield and other qualities.—In treating seed it is recommended that the usual copper sulphate bath be followed by a lime water wash and that seed treated with formaldehyde be washed in water.—*H. M. Woolman.*

4411. Stevens, Neil E. **Rots of early strawberries in Florida and southern California.** Amer. Jour. Bot. **9**: 204–211. *Fig 1–4.* 1922.—*Rhizopus nigricans* Ehrenb., the most common and destructive fungus causing rot of ripe strawberries in Florida, is of minor importance on winter strawberries in California. *Botrytis cinerea* Pers., common on strawberries only under very moist conditions in Florida, is regularly abundant in California in the winter. This difference is evidently not due to lack of opportunity for infection but to environmental differences. Moisture conditions during the winter are slightly more favorable to *Botrytis* in California than in Florida, but the chief factor involved seems to be temperature, since the winter climate of California provides a daily period during which the temperature is favorable for growth of *Botrytis* but unfavorable for *Rhizopus*.—*E. W. Sinnott.*

4412. Stover, W. G. **The relation of soil temperature to the development of the seedling blight of corn caused by Helminthosporium sp.** [Abstract.] Phytopathology **12:** 30. 1922.

4413. Tanaka, Tyôzaburô. **New Japanese fungi notes and translations—XI.** Mycologia **14:** 81–89. 1922.—A description is given of *Helminthosporium Oryzae* Miyabe and Hori sp. nov. ex. S. Hori, parasitic on culms, leaves, and glumes of *Oryza sativa.* The disease appears as minute or elongated discolored spots followed by a withering of the leaf and "often causing death of the entire plant." "Prevention through seed treatment and spraying with various kinds of fungicides has proved to be effective."—*Glomerella Cinnamomi* Yoshino sp. nov. is technically described. It produces brown spots on leaves, petioles, leaf-buds, and young shoots of *Cinnamomum camphora* causing considerable damage.—*Physoderma Maydis* Miyabe (1909) is very briefly described. It attacks *Zea Mais*, occurring in the parenchymatous cells of the culm, midrib, and the lower part of the husk, and producing numerous orbicular, elliptical, or linear spots. *Physoderma Zeae-Maydis* Shaw (1912) "now known as the causal organism of one of the worst diseases of corn in the United States * * * is in many respects identical with the present species, though no actual comparision of the organism has yet been carried out."—A technical description of *Mycosphaerella bambusifolia* Miyake and Hara sp. nov., a parasite of *Phyllostachys puberula* and *P. bambusoides*, is given.—*Phaeosphaeria Bambusae* Miyake and Hara sp. nov. is described; it attacks living leaves of *Arundinaria Simoni* and *Sasa paniculata.*—*Ustilaginoidea Sacchari-narengae* K. Sawada sp. nov. is described as parasitizing *Saccharum narenga.*—Technical descriptions of the following fungi are also given: *Plasmopara Wildemaniana* P. Henn. var. *macrospora* K. Sawada var. nov., parasitic on leaves of *Justicia procumbens; Colletotrichum Boehmeriae* K. Sawada sp. nov., parasitic on *Boehmeria nivea; Cercospora piricola* K. Sawada sp. nov., producing spots on *Pirus communis* and *P. sinensis;* and *Ustilago formosana* K. Sawada sp. nov., on *Panicum proliferum.*—H. R. Rosen.

4414. Teodoro, N. G. **Pathogenicity of Macrosporium parasiticum.** [Abstract.] Phytopathology **12:** 50. 1922.

4415. Traverso, G. B. **Due interessanti micocecidii della Somalia. [Two interesting fungus galls from Somalia.]** Natura **12:** 179–189. *Fig. 1–7.* 1922.—Coralloidal formations found on *Cissus* sp. in Somalia yielded *Uromyces cladomanes* n. sp., for which the botanical description is given. Swellings and deformations on *Acacia Seyal*, to which the natives give the name Fullai, are produced by *Aecidium Schweinfurthii* P. Henn. which the author describes and figures.—*A. Bonazzi.*

4416. Vaughan, R. E., and Fred Reuel Jones. **Colletotrichum Pisi Pat. on garden peas.** [Abstract.] Phytopathology **12:** 47–48. 1922.

4417. Voukassovitch, P. **Observations sur la Cochylis et l'Eudémis faites à Moulon pendant l'hiver 1921–1922. [Winter observations on Cochylis and Eudemis.]** Rev. Zool. Agric. et Appl. Bordeaux **5:** 74–78. *1 fig.* 1922.—The winter season is a critical one in the life of Cochylis and Eudemis. During the mild and dry winter of 1921–1922 the mortality of the chrysalids reached 96 per cent, of which 70 per cent was due to the parasite *Spicaria farinosa* var. *verticilloides* Fron; unfortunately this fungus also kills the larvae of entomophagous Hymenoptera.—*J. Dufrenoy.*

4418. Walker, J. C. **Seed treatment and rainfall in relation to the control of cabbage black-leg.** U. S. Dept. Agric. Bull. 1029. *28 p., 2 pl.* 1922.—Black-leg developed in epiphytotic form in 1917 on cabbages grown from treated seed saved from plants which were slightly infected with *Phoma lingam* in 1916. The evidence was conclusive that the outbreak originated in seed infections which had escaped the seed treatment. Mercuric chloride and formaldehyde at different concentrations, hot water, and desiccation at different temperatures were tried out in an effort to find a method of treatment eliminating the fungus without injury to the seed. No method of treatment tried gave complete control of the fungus without injury to the seed. Mercuric chloride solution (1:1000), in which the seed was soaked for 30 minutes and then rinsed in water, gave the most practical results. Some lots of seed might be safely treated with 1:500 solution, but the disease is not then entirely eliminated. The disease spreads from centers of primary infection in the seed bed, particularly by spatterings of rain or water, and also at the time of transplanting. The disease spreads very little in the field. Little transmission of the disease in the seed bed and no infection of seed plants occurs in regions of little rainfall during the growing season. A source of *Phoma*-free seed is important. The Puget Sound region of western Washington produced disease-free seed in 1919 and 1920, the seasons during which observations were made.—*John A. Elliott.*

4419. Walker, J. C., and W. B. Tisdale. **Further notes on the occurrence of cabbage black-leg.** [Abstract.] Phytopathology **12**: 43. 1922.—The disease is caused by *Phoma lingam* (Tode) Desm.—*B. B. Higgins.*

4420. Walton, R. C. **Report on disease control in Pennsylvania.** Crop Protection Digest [Washington, D. C.] Bull. 1^2: 15–21. 1922.—Experiments are reported in which a sulphur dusting mixture and potato dust were compared with liquid applications of lime-sulphur and soluble sulphur on apples. Lime-sulphur proved more effective than the dusts in the control of apple scab and frog-eye, while there was little difference with respect to fruit spot and sooty blotch. Soluble sulphur was practically as good a fungicide as lime-sulphur but caused severe burning of the foliage.—*F. D. Fromme.*

4421. Weber, George F. **Studies on corn rust.** Phytopathology **12**: 89–97. *Fig. 1–3.* 1922.—The points of consideration in this investigation of *Puccinia Sorghi* Schw. were: (1) relation of temperature to germination of urediniospores; (2) relation of temperature to infection by urediniospores; (3) mode of host penetration in uredinial infection; (4) overwintering of urediniospores; and (5) relative susceptibility of seedlings of corn varieties. The minimum, optimum, and maximum temperatures for germination of the urediniospores were found to be 4, 17, and 32°C. respectively. For infection of corn plants, the optimum temperature was about 18°C. and the maximum was somewhat below 32°C. The germ tubes enter through the stomata. Infected corn leaves bearing quantities of urediniospores were overwintered in various situations, and the germination of the spores was tested at 15-day intervals throughout the winter and spring. After February 15 no germination was obtained from any of the lots. Inoculation tests indicate that there is no biologic specialization on the part of the fungus; but there is some variation in the susceptibility of different varieties of corn.—*B. B. Higgins.*

4422. Weber, George F. **Studies on Septoria disease of cereals and certain grasses** [Abstract.] Phytopathology **12**: 44. 1922.

4423. Weiss, Freeman. **The effect of rust infection on the water-requirement of wheat.** [Abstract.] Phytopathology **12**: 31. 1922.

4424. Weiss, Freeman, and C. R. Orton. **Progress notes on potato wart disease investigations.** [Abstract.] Phytopathology **12**: 38. 1922.—The disease is caused by *Synchytrium endobioticum* (Schilb.) Perc.—*B. B. Higgins.*

4425. WELDON, GEO. P. **Dry lime-sulfur solution vs. lime-sulfur in the control of peach leaf curl (Exoacus deformans).** Monthly Bull. Dept. Agric. California **10**: 170–172. *Fig. 38.* 1921.—Experiments conducted by the author indicate that liquid and dry lime sulphur are equally effective in the control of leaf curl of the peach.—*E. L. Overholser.*

4426. WELLES, COLIN G. **Cercospora leaf spot of eggplant.** Phytopathology **12**: 61–65. *Fig. 1–2.* 1922.—A leaf spot of eggplant (*Solanum melongena* L.), not previously reported, has recently been very abundant on the experimental grounds at the College of Agriculture, Los Baños, Philippine Islands. The disease is ascribed to a new species of *Cercospora* which is described as *Cercospora melongenae* n. sp. The disease is apparently confined to the eggplant; and it is much more severe on the native variety than on a Siamese variety. The disease is readily held in check by spraying with Bordeaux mixture every 2 weeks.—*B. B. Higgins.*

4427. WELLES, COLIN G. **Two serious plant diseases new to the Philippines.** Philippine Agric. **10**: 253–254. 1921.—Cotton anthracnose (caused by *Colletotrichum Gossypii* Southw.) and a leaf spot of sweet potato (caused by *Cercospora batatae* Zimm.) have recently been found in the Philippines.—*Sam F. Trelease.*

4428. WHITE, E. W. **Control of anthracnose, or black spot canker.** Better Fruit **16**^{8}: 7, 21; **16**^{9}: 12, 18–19. 1922.—Experimental spraying with Bordeaux, 3–4–40, applied once early in the season (September), Bordeaux, 3–4–40, applied early and followed by another spraying with Bordeaux, 6–6–40, late in the season (November), and only 1 late spraying with strong Bordeaux (6–6–40), showed that the early spray is essential for the control of this disease. A weak Bordeaux is efficient if applied early enough. Because of spray deposit late varieties of apples require wiping before packing. Covering of Bordeaux did not interfere with coloring of the fruit, while their keeping quality was greatly improved. Spraying, to be efficient, must be done systematically each year.—Another test showed that on some varieties of apples (King, Jonathan) anthracnose may be economically controlled by 1 spray in the last week of August with 1–1½–40 Burgundy followed with 3–4–40 Bordeaux as soon as the fruit is picked. Burgundy leaves no deposit on the fruit.—*A. E. Murneek.*

4429. WILTSHIRE, S. P. **A disease of Michaelmas daisies.** Jour. Bath and West and Southern Counties Soc. **15**: 129–130. 1921.—A preliminary note is presented. A disease causing considerable damage to Michaelmas daisies was discovered during the summer of 1920. A Fusarium, that seems to be responsible for the disease, was isolated from diseased shoots. Since Michaelmas daisies are propagated normally by the division of the old roots it is recommended that only healthy roots be used for propagation.—*J. I. Lauritzen.*

4430. WILTSHIRE, S. P. **The apple canker fungus.** Jour. Bath and West and Southern Counties Soc. **14**: 113–120. 1920.—The fungus, *Nectria ditissima* Tul., grows successfully on malt-extract agar, malt-extract gelatin, apple-wood-extract gelatin, raisin-salt gelatin, Claussen's medium cornflower-extract agar, and glycerin-potato agar; produces abundant conidia on most media; and develops perithecia on malt-extract agar. It has a maximum growth temperature of 33°C., an optimum of from 20 to 22°C., and grows poorly at a temperature of from 2 to 10°C. The germ tubes of the conidia, under well aerated conditions, are negatively heliotropic, the conidiophores positively heliotropic, and the mature mycelium insensitive to light. Infection of apparently uninjured buds seems to occur. Coal tar was the only substance used to cover old cankers that tended to keep the fungus within the stem. Some infection takes place through bursted galls produced by woolly aphis.—*J. I. Lauritzen.*

4431. WILTSHIRE, S. P. **The bark canker disease of apples.** Jour. Bath and West and Southern Counties Soc. **15**: 128. 1921.—The bark canker disease of apples, caused by *Myxosporium corticolum* Edgerton, appeared, it seems, for the first time in England in various plantations at Long Ashton.—*J. I. Lauritzen.*

4432. Wiltshire, S. P. **The dieback of red currants.** Jour. Bath and West and Southern Counties Soc. **14:** 120–123. 1920.—*Cytosporina Ribis* Miy. and *Nectria cinnabarina* (Tode) Fr. were isolated from a disease that produces wilting of the leaves and fruit and shrivels the branches of red currants. Both fungi produced a diseased condition of the shoots. The present is a preliminary note.—*J. I. Lauritzen.*

4433. Wiltshire, S. P., and G. T. Spinks. **Apple tree canker.** Jour. Bath and West and Southern Counties Soc. **15:** 124–125. 1921.—Infection appears to take place through cracks in leaf-scar tissue. Bud infection of 1919 wood of Medialle d'Or and Kingston Black crosses became evident during the last of March and early April of 1920. Bud infection of 1919 wood on the varieties King of the Pippins and Devonshire Quarrendeon became evident the latter part of September, 1919. No autumn infection took place so long as the leaves remained on the trees. Spraying decreased the amount of canker.—*J. I. Lauritzen.*

4434. Wingard, S. A. **A yeast parasitic on lima beans.** [Abstract.] Phytopathology **12:** 47. 1922.

4435. Wolf, Frederick A. **A leafspot disease of tobacco caused by Phyllosticta nicotiana E. & E.** Phytopathology **12:** 99–101. 1922.—A leaf spot has been noted during several seasons on seedling tobacco (*Nicotiana tabacum* L.) plants and also on mature plants in the field; though the disease is considered of minor importance. It is caused by a species of *Phyllosticta* tentatively referred to *Phyllosticta nicotiana* E. & E.—*B. B. Higgins.*

4436. Zeller, S. M., and C. E. Owens. **European canker in Pacific Coast States.** [Abstract.] Phytopathology **12:** 105. 1922.—The disease is caused by *Nectria galligena* Bres.—*B. B. Higgins.*

4437. Zundel, George L. **The effects of treatment for bunt on the germination of wheat.** Phytopathology **11:** 469–484. *Fig. 1–2.* 1921.—An attempt has been made to discover a method of applying fungicides to seed wheat which will cause less injury to germination than present methods in general use. The fungicides used were copper sulphate and formaldehyde. The effect of varying the strength of the solution and the length of exposure, of presoaking before treatment, of dipping in lime water after treatment, and of varying soil moisture on the germination of treated seed was studied. Ten-minute exposure to the strengths usually recommended,—1 pound of copper sulphate to 5 gallons of water or 1 pint of formaldehyde to 40 gallons of water,—produced less injury than longer exposure to more dilute solutions. A combination of presoaking, treatment for 10 minutes, and subsequent liming produced very little injury; but presoaking is not practicable on a large scale. For farm use treatment for 10 minutes, followed by 3 minutes in lime water and subsequent drying, is recommended. An extensive bibliography and a discussion of previous work on the subject are given.—*B. B. Higgins.*

DISEASES CAUSED BY BACTERIA

4438. Barrett, J. T. **Notes on bacterial gummosis of stone fruits.** [Abstract.] Phytopathology **12:** 103–104. 1922.—The gummosis is caused by *Pseudomonas cerasus* Griffin.—*B. B. Higgins.*

4439. Fawcett, H. S. **The relation of Citrus blast to certain environmental factors.** [Abstract.] Phytopathology **12:** 107. 1922.—The disease is caused by *Bacterium citriputeale.* —*B. B. Higgins.*

4440. Gram, E. **Kartoffelskurv.** [**Potato scab.**] Ugeskr. Landmaend **66:** 620–622. 1921. —A review of the present situation and suggestions for control are given. Where potatoes arnof importance and potato scab is unknown, due to acid reaction of the soil, it is urged that lime or marl be given in very limited amounts, or that special fields for acidocline crops be maintained without liming.—*Ernst Gram.*

4441. Hedges, Florence. **A bacterial wilt of the bean caused by Bacterium flaccumfaciens nov. sp.** Science 55: 433–434. 1922.—This disease appeared on navy beans in South Dakota, and later, through infected seed, in Virginia. The leaves of seedlings wilt and may be discolored; surviving shoots are dwarfed and the yield is much reduced.—Examination showed bacteria in the vessels of the stem with dull green to brownish discoloration of the vascular ring. Presumably the vessels are plugged by bacteria.—This disease resembles the "systemic disease" caused by *Bacterium Phaseoli*, but the parasite behaves very differently on various culture media, including potato cylinders and Congo Red agar.—The bacterium is a polar flagellate rod $\frac{2}{3}$–3 μ by $\frac{1}{3}$–$\frac{1}{2}$ μ occurring singly or in pairs.—*C. J. Lyon.*

4442. Levine, Michael. **Studies on plant cancers, IV.—The effect of inoculating various quantities of different dilutions of Bacterium tumefaciens into the tobacco plant.** [Abstract.] Phytopathology 12: 56. 1922.

4443. Ludwig, C. A. **The control of angular leaf spot of cotton.** Phytopathology 12: 20–22. 1922. [Also Abst. in Phytopathology 12: 50. 1922.]—The disease is caused by *Bacterium Malvacearum* Smith. The seed were delinted with strong sulphuric acid, washed, treated 10 minutes in a 1–1000 mercuric chloride solution, washed, and dried. Two plantings of treated seed in comparison with untreated seed from the same lot confirmed former reports of the efficiency of the method.—*B. B. Higgins.*

4444. Melhus, I. E., and T. J. Maney. **Studies on the infection and control of crown gall on apple grafts.** [Abstract.] Phytopathology 12: 55. 1922.—The disease is caused by *Bacterium tumefaciens* Smith & Townsend.—*B. B. Higgins.*

4445. Riker, A. J. **Studies of crown gall.** [Abstract.] Phytopathology 12: 55–56. 1922. —The disease is due to *Bacterium tumefaciens* Smith & Townsend.—*B. B. Higgins.*

4446. Slagg, C. M. **Preliminary report on a study of the wildfire disease of tobacco.** [Abstract.] Phytopathology 12: 51–52. 1922.—The disease is caused by *Bacterium tabacum* Wolf and Foster.—*B. B. Higgins.*

4447. Smith, C. O. **Pathogenicity of the olive knot organism on hosts related to the olive.** [Abstract.] Phytopathology 12: 106. 1922.—The disease is caused by *Pseudomonas savastanoi* E. F. S.—*B. B. Higgins.*

4448. Smith, C. O. **Some studies relating to infection and resistance to walnut blight, Pseudomonas Juglandis.** [Abstract.] Phytopathology 12: 106. 1922.

4449. Smith, Clayton O. **Some studies relating to infection and resistance to walnut blight.** Monthly Bull. California Dept. Agric. 10: 367–371. *Fig. 72.* 1921.—Walnut blight is caused by *Pseudomonas Juglandis* Pruci, which attacks the leaves, nuts, catkins, and tender shoots of *Juglans regia*, the English walnut. The only known sources of infection are the old blight lesions. The organism is found on the buds some time before growth begins in the spring, but probably causes little or no infection until the new growth appears. Water, as fog or rain, and pollen from infected catkins act as carriers of the organism. Experiments indicate that the organism is not able to grow in the soil. Tests of several commercial varieties indicate differences in resistance to walnut blight, Ehrhardt being less susceptible than the Placentia and seedlings. This seems to be confirmed by orchard observations.—*E. L. Overholser.*

4450. Swingle, D. B. **Pear and apple blight in Montana.** Better Fruit 16^{12}: 12–13, 18–19. 1922.—Pear and apple blight made its first appearance in Montana in 1905. Since then it has spread throughout the state, killing great numbers of trees. The relative susceptibility to this disease of the leading commercial varieties of apples and pears is given. The usual methods of control of pear and apple blight are discussed in detail.—*A. E. Murneek.*

4451. Wolf, Frederick A. **Additional hosts for Bacterium Solanacearum.** Phytopathology 12: 98–99. 1922.—*Bacterium Solanacearum* E. F. Smith was found producing a wilt of soybeans (*Soja max*), of dahlia (*Dahlia rosea*), and of cosmos (*Cosmos bipinnatus*) during August, 1921.—*B. B. Higgins.*

INFECTIOUS CHLOROSES (PEACH YELLOWS AND MOSAIC GROUPS, ETC.)

4452. Anonymous. **Sugar cane mosaic infested areas.** Florida State Plant Bd. Circ. 44. *2 p.* 1922.—This public notice declares a certain number of counties in Florida to be infested with the mosaic disease of sugar cane. Shipment of cane out of these counties is prohibited.—*J. C. Th. Uphof.*

4453. Barrus, M. F., and Charles Chupp. **Yellow dwarf of potatoes.** [Abstract.] Phytopathology 12: 39. 1922.

4454. Blanchard, E., et C. Perret. **La maladie de l'enroulement de la pomme de terre. [Leaf-roll of potato.]** Ann. Epiphyties 7: 294–303. 1921.—The authors claim from experiments carried on at Merle (Loire) and in the Forez plain that the actual cause of leaf-roll can not be an infection as Quanjer maintains, but that it is probably a case of a physiological affection or rather a nutritional defect inherent in the tuber.—It may be questioned whether the increase of the disease is not due to the cultural methods and inadequate fertilizers used during the war.—Practical recommendations are given for improving potato cultivation in regions where it is declining: (1) More abundant fertilizing, especially by the application of a covering of soluble nitrogenous manure. The authors are of the opinion that fertilizing is not able to keep the productive capacity unimpaired, but it retards degeneration. (2) Systematic renewal of seed. The best and most stable varieties should be carefully sought. Only such varieties should be brought into regions where production is decreasing. The choice of good seed is more important than good fertilizer. (3) Growing new varieties from seed.—*E. Foëx.*

4455. Blodgett, F. M. **The relation of time and temperature to the killing of potatoes and potato mosaic virus.** [Abstract.] Phytopathology 12: 40. 1922.

4456. Blodgett, F. M., Karl Fernow, and F. R. Perry. **Testing seed potatoes for mosaic and leaf-roll.—II.** [Abstract.] Phytopathology 12: 40–41. 1922.

4457. Dickson, B. T. **Further studies on mosaic.—I.** [Abstract.] Phytopathology 12: 42. 1922.

4458. Dickson, B. T., and G. P. McRostie. **Further studies on mosaic.—II.** [Abstract.] Phytopathology 12: 42. 1922.

4459. Doolittle, S. P., and M. N. Walker. **Notes on cucurbit mosaic.** [Abstract.] Phytopathology 12: 42–43. 1922.

4460. Ducomet. **Observations et expériences sur les maladies de dégénérescence de la pomme de terre. [Observations and experiments on degeneration diseases of the Irish potato.]** Bull. Soc. Path. Vég. France 9: 29–38. 1922.—Leaf roll and curly leaf are prevalent everywhere in all types of soil and at all altitudes in the same variety (Institut de Beauvais).—Seventy varieties were studied; none was free from degeneration, but the percentage of plants attacked and the intensity of injury varied greatly.—Wild species of *Solanum* (*S. maglia, S. commersonii, S. calvasii*) are attacked by leaf roll and curly leaf.—The symptoms of degeneration diseases can be distinguished only by observing successive generations from one stock: (1) There exist at least 2 forms of leaf roll, the classic horn-shaped leaf roll and the spoon-shaped leaf roll (Quanjer's marginal leaf roll). (2) The form of degeneration called mosaic by Orton should be designated by the name of curly leaf applied to it in Parmentier's time. In fact the disease is recognizable by the markings and undulations on the margin of the leaf well in advance of the dwarf stage corresponding to the curly dwarf of American authors; the alternation of light and dark areas supposed to characterize the disease is the exception rather than the rule.—Finally, there exist other very distinct mosaics, such as the Aucuba mosaic or infectious variegation of the Dutch.—Leaf roll is xerophytic; the disease is more apparent as the atmosphere is dry, and selection for leaf roll can be made only in dry weather. Leaf roll always begins with the lower leaves and progresses upward. True leaf roll has this triple character: rolling and hardening of the leaflets, lack of movement of starch, and necrosis of the phloem; the persistance of starch in the leaves precedes their rolling, which takes place before the alteration of the phloem.—A very large proportion of plants grown from degenerated seed are diseased.—*J. Dufrenoy.*

4461. Foëx, E. **La maladie de l'enroulement de la pomme de terre.** [Leaf-roll of potato.] Ann. Epiphyties 7: 281–287. *2 pl.* 1921.—The author devotes himself to a microchemical study of phloem necrosis.—Solubility in Schultze's reagent and staining reaction (yellow with iodinated hydriodic acid, red with sulphate of aniline) appear to indicate lignin, the presence of which is also shown by Maule's reagent and ammoniacal fuchsin. However, insolubility in sulphuric acid as well as in boiling alkali, also yellowing with potassium, suggest that lignin is associated with cutin or suberin, shown by the color obtained with Sudan III and Ircanette stain.—Chloride of benzidine and bichromate of potash stain wood, cork, and cutin equally well.—To sum up, phloem necrosis is a process of pectic degeneration which has not gone far enough to produce a true gummosis. It is probable that the arrested pectic swelling and hardening of necrosed elements may be attributed to the rapid appearance of lignin and suberin. Ligno-suberification seems to be especially early in the membranes which remain thin.—*E. Foëx.*

4462. Gardner, Max W., and James B. Kendrick. **Overwintering of tomato mosaic.** [Abstract.] Phytopathology **12**: 41–42. 1922.

4463. Johnson, James. **Experimental evidence relating to the nature of the mosaic virus.** [Abstract.] Phytopathology **12**: 52. 1922.

4464. Melhus, I. E. **Mosaic studies.** [Abstract.] Phytopathology **12**: 42. 1922.

4465. Rankin, W. H., J. F. Hockey, and J. B. McCurry. **Leaf curl and mosaic of the cultivated red raspberry.** [Abstract.] Phytopathology **12**: 58. 1922.

4466. Reddick, Donald. **A hybrid bean resistant to anthracnose and to mosaic.** [Abstract.] Phytopathology **12**: 47. 1922.

4467. Schultz, E. S., and Donald Folsom. **Transmission of potato streak.** [Abstract.] Phytopathology **12**: 41. 1922.

4468. Severin, Henry H. P. **Control of the leafhopper.** Facts about Sugar **14**: 312–313, 332–333. 1922.—Suggestions are given regarding the control of the leafhopper, *Eutettix tenella* Baker, the insect which spreads the beet curly leaf disease by the use of nicotine. The time of treatment would depend upon the period of invasion of the fields by the insects. The object would be to control the spring brood which invades the fields. In the natural breeding areas of the insect, control with poisons would probably not be economical.—*C. W. Edgerton.*

4469. Severin, Henry H. P. **Minimum incubation periods of causative agent of curly leaf in beet leafhopper (Eutettix tenella Baker) and sugar beet.** [Abstract.] Phytopathology **12**: 105. 1922.

4470. Severin, Henry H. P. **The life history of the beet leafhopper.** Facts about Sugar **14**: 92–93, 110–111, 130–131, 152–154, 158, 170–171. *Fig. 1–16.* 1922.—The complete life history is given of the beet leafhopper, *Eutettix tenella* Baker, the insect responsible for the spread of the beet curly leaf disease.—*C. W. Edgerton.*

DISEASES OF UNKNOWN CAUSE

4471. Bruner, Stephen C. **La muerte de los cocoteros.** [The death of coconut trees. Rev. Agric. Com. y Trab. [Cuba] 5^1: 9–10. 1922.—The author takes exception to a published statement by C. Bencomo (Havana, 1921) that the Cuban bud-rot disease is due to a coleopterous insect, *Oryctes Rhinoceros*. *Strategus anachoreta* Burm. and *S. titanus* Fabr. are found attacking coconuts in Cuba but no species of *Oryctes*. Neither species of *Strategus*, however, is held responsible for the bud-rot disease. *Bacillus coli* as a causative agent for the disease is questioned. Reference is made to the findings of other workers in regard to possible causes for the disease: (1) W. Nowell of Trinidad attributes it to a nematode, *Aphelenchus cocophila*; (2) O. Reinking of the Philippines attributes it to a fungus, *Phytophthora faberi* Maub.; (3) S. F. Ashby of Jamaica also attributes it to a fungus, *Phytophthora palmivora* But. The author believes the findings of these last 3 authors to be a more plausible explanation of the cause of the disease than either the coleopterous insects or *B. Coli*.—*G. R. Hoerner.*

4472. Faull, J. H. **Preliminary report: In Report of the Forestry Branch, 1918.** Ann. Rept. Minister Lands, Forests and Mines, Ontario **1918**: 156–160. 1919.—An introductory note is presented on needle blight of *Pinus Strobus*, a disease characterized by progressive reddening of the new leaves as they unfurl from the buds until from $\frac{1}{3}$ to $\frac{2}{3}$ of the total length at maturity are involved. Several hundred diseased trees were marked for further study.—*A. W. McCallum.*

4473. Faull, J. H. **Report for 1919.** Ann. Rept. Minister Lands, Forests and Mines, Ontario **1919**: 119–125. 1920.—Observations made on coniferous trees at a distance of 4–6 miles from winter roasting beds indicate that no injury occurs in winter from sulphur fumes. Analysis of the results obtained from a study of marked trees indicates that blighted young white pines usually recover while a variable percentage of older trees also recover but more slowly. The mortality in old trees is about 5 per cent. In an endeavor to determine the cause of needle blight several hundred inoculations, using juice from diseased foliage, were made on healthy twigs of healthy trees. No infection resulted, however. The root systems of several small, blighted trees were next examined; this revealed the seat of the trouble. The main branches of these root systems were in most cases killed back from 4 to 12 inches or more from the tips and few of the laterals appeared healthy. In contrast the root systems of young, healthy trees were normal. The leaf injury, then, is due to the fact that, in early summer, when there is a sudden increase in the water requirements of the tree the roots are unable to supply it. The cause of the root injury is, as yet, unknown though drought seems the most likely explanation. A list of tree diseases observed in Northern Ontario is appended.—*A. W. McCallum.*

4474. Halbert, H. A. **Treatment for rosette.** Amer. Nut Jour. **15**: 7. 1921.—The author states that rosette of pecan is due to the inability of roots to find plant food in sufficient quantities. The mechanical condition of the soil may have some effect upon the disease. For control the author recommends the addition of plant food elements, and breaking the impervious layers of soil by the use of dynamite.—*E. L. Overholser.*

4475. Lees, A. H. **A method of identifying reversion of black currants.** Jour. Bath and West and Southern Counties Soc. **15**: 133–138. *1 pl.* 1921.—This article appeared previously under the title Reversion of Black Currants: a Method of Identification [see Bot. Absts. 9, Entry 403]. Since the only methods known for curtailing the ravages of the disease are the propagation of sound stock and rogueing, a detailed description of the diseased plants is given to enable the grower to detect them.—*J. I. Lauritzen.*

4476. Molliard, Marin. **Sur une cécidie du funicule chez le melon vert de Malte. [A tumor of the funicle in the green Malta melon.]** Bull. Soc. Path. Vég. France **9:** 42–44. 1922.—Tumors were found deforming the funicles and seed in the interior of melons coming from Provence. The normal funicle is made up of a surface covering of large cells and a central cylinder with little vascular development; the tumor causes numerous divisions of the parenchyma cells of the central cylinder, each daughter-cell forming vessels and becoming transformed itself into a central cylinder.—No organism was found by microscopic examination of diseased tissues, nor developed in culture.—*J. Dufrenoy.*

4477. Rands, R. D. **De bruine binnenbastziekte van Hevea brasiliensis. [Brown bast disease of Hevea brasiliensis.]** Arch. Rubber Cult. Nederland. Indie. **3:** 156–159. 1919.—In his studies of this disease the author has failed to isolate a causal organism. He finds the brownish substance which gives the disease its name to be more like a wound-gum than like lignin. He considers it likely that the disease is an exaggerated gum production resulting from the response of the tree to tapping.—*Carl D. La Rue.*

4478. Waters, R., and E. H. Atkinson. **Yellow leaf disease in Phormium tenax.** New Zealand Jour. Agric. **24:** 27–32. 1922.—A species of *Ramularia* has been isolated from diseased plants and its possible pathogenicity is being carefully tested. Bacterial cultures have also been secured but give no evidence of pathogenicity.—*N. J. Giddings.*

4479. Whittle, C. A. **Pecan rosette overcome by mulching.** Amer. Nut Jour. **14:** 45. 1921.—The following results were obtained in an experiment performed to show the effect on pecan rosette of a mulch of pine straw 8 inches thick after being matted down by the rains. In a plot of 43 trees, 8 were free from rosette, 15 slightly affected, and 20 badly affected. After 2 seasons of mulching there were in the same plot 40 trees free from rosette and only 3 that showed even slight evidence of the disease. In an adjoining check plot of untreated trees, the rosette had become worse during the 2 seasons. The mulch retained moisture and prevented weed growth.—*E. L. Overholser.*

4480. Wiltshire, S. P. **A bacterial infection of plum trees.** Jour. Bath and West and Southern Counties Soc. **15:** 125–128. 1921.—Both bacteria and fungal hyphae were found in the diseased tissue of the cortex in the canker-like areas of branches and the trunks of plum trees. Fructifications of *Cytospora* generally occurred on the cankered area. A bacterium has been isolated, but its relation, or the relation of *Cytospora*, to the disease has not been ascertained.—*J. I. Lauritzen.*

4481. Zeller, S. M. **Die-back of loganberry in the Northwest.** [Abstract.] Phytopathology **12:** 104. 1922.

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

4482. Berger, E. W. **Natural enemies of scale insects and whiteflies.** Florida State Plant Bd. Quart. Bull. **5:** 141–154. *Fig. 12–21.* 1921.—Florida has many fungous parasites on insect pests of citrus and other plants. Pure cultures of some of these fungi have been furnished by the State Plant Board since 1915 at 75 cents per culture. It is recommended that the fungus be introduced during the summer rains by spraying a water-suspension of the spores into infested trees; this should be done before the trees become heavily infested with scales and whiteflies. The following scale-infesting fungi occur in Florida: *Sphaerostilbe coccophila* parasitic on purple scale (*Lepidosaphes beckii*), long scale (*L. gloverii*), San José scale (*Aspidiotus perniciosus*), Chinaberry scale (*A. hederae*), and shaff scale (*Parlatoria pergandii*); *Microcera fugikuroi* parasitic on Florida red scale (*Chrysomphalus aonidum*), water oak scale (*C. obscurus*), red maple scale (*C. tenebricosus*), California red scale (*C. aurantii*), and purple scale (*Lepidosaphes beckii*); *Ophionectria coccicola* parasitic on *L. gloverii*, *L. beckii*, and *Parlatoria pergandii*; *Myriangium duriaei* parasitic on *Lepidosaphes beckii*, *L. gloverii*, *Parlatoria pergandii*, *Aspidiotus perniciosus*, and Putnam's scale (*A. ancylus*). *Aschersonia* *cubensis* lives on Liriodendron scale (*Toumeyella liriodendri*), pyriform scale (*Pulvinaria pyriformis*), and tessellated scale (*Eucalymnatus tessellatus*). *Aschersonia turbinata* is a parasite of Florida wax scale (*Ceroplastes floridensis*). *Aschersonis alcyrodis* occurs on common whitefly (*Dialeurodes citri*) and cloudy winged whitefly (*D. citrifolii*); and *Aschersonia flavo-citrina*, on *D. citrifolii*. *Aegerita webberi* and *Microcera* sp. have been found on *D. citri* and *D. citrifolii*. *Verticillium heterocladum* is parasitic on larvae of *D. citri*, *Parlatoria pergandii*, *Lepidosaphes beckii*, and *L. gloverii*.—*J. C. Th. Uphof.*

4483. Essig, E. O. **Para-dichlorobenzene, a soil fumigant.** Monthly Bull. California Dept. Agric. **11**: 28–30. *Fig. 11.* 1922.

4484. Fenton, F. A., and Albert Hartzell. **Control of the potato leafhopper.** Iowa Agric. Exp. Sta. Circ. 77. *4 p., 5 fig.* 1922.—The first appearance of injury from "burning" is recognized by a burned area at the tip of the leaf, thence following back along the midrib. This injury is caused by leafhoppers on the underside of the leaves. Bordeaux mixture spray (4–4–50) has been found effective for control of tip burn or "hopperburn." This mixture repels the adults, and prevents them from laying their eggs on the leaves. Bordeaux mixture should be applied, especially on the under side of the leaves, as soon as the adult hoppers are noticed on the vines.—*Florence Willey.*

4485. França, Carlos. **Sur deux Phytoflagellés (L. Elmassiani Migone et L. Bordasi sp. n.). [Upon the two plant flagellates Leptomonas elmassiani Migone and L. bordasi sp. nov.]** Ann. Soc. Belge Méd. Trop. **1**: [Pages ?] *2 pl., fig. 2.* 1921.—Since the discovery of *Leptomonas* in Euphorbias another phytoflagellate has been described,—in 1916,—by Migone from one of the Asclepiadaceae (*Funastrum bonoeriensis*) in Paraguay. The same investigator has since found another parasitized plant in the same family, namely, *Morrenia odorata*. França gives a comparative description of the 2 species of *Leptomonas*,—*L. elmassiani* Migone and *L. bordasi* n. sp.—He discusses the taxonomy of the Trypanosomes and calls special attention to the distinction between the genera *Leptomonas* and *Herpetomonas*. He criticizes the recent views of Wenyon and is of the opinion that host differences should have no weight in defining genera.—*L. elmassiani* exists not only in Paraguay but in Uruguay (E. Cordero). Migone has found recently upon the plant host a hemipter, *Oncopeltus lactuosus*, in the intestines of which were numerous leishmaniform elements measuring 3–3.7 by 2.2–2.9μ, and provided with nucleus and large blepharoplast.—*L. elmassiani* is smaller than *L. davidi* while *L. bordasi* parasite of *Morrenia odorata*, is larger. In *L. elmassiani* as in *L. davidi*, during the course of longitudinal division the blepharoplast always divides before the nucleus which has an oblique axis of division. In *L. bordasi* the division of the nucleus precedes that of the blepharoplast and the axis of division is parallel to that of the parasite. Curiously, the appearance of the new flagellum coincides with the division of the nucleus and not with that of the blepharoplast.—Parasitized plants appear to suffer no ill effects. [From abstract by F. Mesnil in Bull. Inst. Pasteur 20: 283. 1922.]—*Frederick V. Rand.*

4486. Franchini, G. **Nuove ricerche su piante a lattice, in ispecie apocinee ed asclepiadee. Nota preventica. [New investigations upon latex plants of the families Apocynaceae and Asclepiadaceae.]** Pathologica **13**: 474–476. 1921.—In the pursuance of his studies upon latex plants in the Italian botanical gardens Franchini calls attention to flagellates inhabiting the latex of 2 species of the family Apocynaceae,—*Acokanthera spectabilis* and *A. venenata*,—represented in the gardens of Florence and Bologna by old shrubby specimens. These flagellates appear to belong to the same genus as those of the Euphorbiaceae and Asclepiadaceae. Franchini creates for them the new species *Herpetomonas* (= *Leptomonas*) *apocyneae*, and gives a brief description of the parasite.—In the Asclepiadaceae of the same gardens, Franchini found various bacteria but no flagellates.—He reports observing numerous parasitized hemipters of the genus *Pyrrhocoris* on parasitized Euphorbias. [From abstract by F. Mesnil in Bull. Inst. Pasteur **20**: 283–284. 1922.]—*Frederick V. Rand.*

4487. Godfrey, G. H. **The stem and bulb infesting nematode in America.** [Abstract.] Phytopathology 12: 52–53. 1922.—The organism concerned is *Tylenchus dipsaci* Kühn.—*B. B. Higgins.*

4488. Leach, J. G. **Leaf hopper injury to potatoes.** [Abstract.] Phytopathology 12: 37. 1922.

4489. McKay, M. B. **Occurrence of Tylenchus dipsaci on alfalfa in Oregon.** [Abstract.] Phytopathology 12: 105. 1922.

4490. Sergent, Etienne. **Existence de Leptomonas davidi dans le latex d'Euphorbiacées d'Algérie (E. peploïdes).** [**Existence of Leptomonas davidi in the latex of Euphorbia in Algeria.**] Arch. Inst. Pasteur Afrique Nord 1: 58. 1921.—In Algeria during May the author claims to have found *L. davidi* in the latex of *Euphorbia peploides*. The leaves were yellowed. This is the first time that this flagellate has been reported from North Africa and, so far as the author is aware, in *E. peploides.*—*Frederick V. Rand.*

4491. Watson, J. R. **Control of root-knot II.** Florida Agric. Exp. Sta. Bull. 159. *29–44, 1 fig.* 1921.—Root-knot caused by *Heterodera radicicola* Atk. is one of the most widespread diseases in Florida. Newly cleared land is usually free. On stiff clay or wet soils it is not as destructive as on drained sandy land. A list of 43 host plants is given. Means of control are discussed, including control by starvation, summer fallow, penning chickens on the land, constant cultivation of resistant crops, flooding, sterilization of the soil by steam or hot water, and sterilization by the use of chemicals such as cyanamid, sodium cyanide, and ammonium sulphate.—*J. C. Th. Uphof.*

NON-PARASITIC DISEASES

4492. Barker, B. T. P. **Leaf scorch.** Jour. Bath and West and Southern Counties Soc. 15: 115. 1921.—A progress report is made.—*J. I. Lauritzen.*

4493. Bartholomew, E. T. **Internal decline of lemons.** [Abstract.] Phytopathology 12: 106. 1922.

4494. Brooks, Charles, J. S. Cooley, and D. F. Fisher. **Experiments on the use of oiled fruit wraps for the control of apple scald.** [Abstract.] Phytopathology 12: 103. 1922.

4495. Draghetti, Alfonso. **Contributo alla "stretta" del frumento.** [**A contribution to the study of the phenomenon "stretta" or "drought morphology" of the wheat grain.**] Staz. Sper. Agrarie Ital. 54: 257–277. 1921.—A comparison is made of several varieties grown in a moist and in a dry year, with respect to purity, germination, ratio of opaque to transparent seed, dry matter contents, specific gravity, total and soluble nitrogen, proteins, etc. It was found that meteorological conditions affected different varieties in a very distinct manner.—*A. Bonazzi.*

4496. Elliott, Charlotte. **Sterility of oats.** U. S. Dept. Agric. Bull. 1058. *8 p., 4 fig.* 1922.—Considerable sterility occurs on oat panicles with no apparent connection with halo blight or in fields where there are no bacterial lesions. Amount of sterility varies with different varieties of oats and does not seem to be in proportion to susceptibility to halo blight. Plants sprayed with sterile water or water suspensions of bacteria and covered 2 or 3 days showed greatly increased sterility. Although abundant halo lesions result from spraying with bacterial suspensions, the consequent sterility is only slightly, if any, greater in amount than that induced by sterile water. It seems probable that rains falling about the time the oat sheaths are ready to open may have the same effect as the sterile water, and that most of the sterility in oat fields is not the result of the halo-blight organism but of too much moisture about the developing panicles. Suggestions are made as to the procedure proposed in breeding hardier varieties from those least susceptible.—*J. T. Buchholz.*

4497. Faull, J. H. **Records for four years on the needle blight of Pinus Strobus.** [Abstract.] Phytopathology **12**: 58–59. 1922.

4498. Folsom, Donald, and E. S. Schultz. **Potato tipburn in northeastern Maine.** [Abstract.] Phytopathology **12**: 36–37. 1922.

4499. Haselhoff, E. **Versuche über die Wirkung von Flugstaub auf Boden und Pflanzen. [Effect of dust application on soil and plants.]** Landw. Jahrb. **54**: 289–319. 1919.—Experiments were conducted to determine the effect of dusts of various compositions on the growth of plants. Powdered cement, tin oxide, deposits from gas filters, copper refining ovens, blast furnaces of iron works and chemical factories were tested on beans, oats, carrots, wheat, barley, grass, and peas. Dust was sprinkled on the plants 14 days after they were up and at intervals of 8 days afterwards. Results varied with different species of plants and with the same species in different years, due to the composition of the dust and to the length of time it remained on the plant. Sulphides were found to be the most injurious constituent of the dusts used, and sodium sulphate next in importance. Dusts deposited on the soil instead of directly on the plant produced similar effects.—*Edith K. Cash.*

4500. Johnson, James. **Non-parasitic leafspots of tobacco.** [Abstract.] Phytopathology **12**: 52. 1922.

4501. K[enoyer], L. A. [Misprinted L. G. K.] [Rev. of: Hahn, Glenn G., Carl Hartley, and Arthur S. Rhoades. **Hypertrophied lenticels on the roots of conifers and their relation to moisture and aeration.** Jour. Agric. Res. **20**: 253–265. 1920. (see Bot. Absts. 8, Entry 1374).] Jour. Indian Bot. **2**: 268–269. 1921.

4502. Korstian, C. F., and N. J. Fetherolf. **Control of stem girdle of spruce transplants caused by excessive heat.** Phytopathology **11**: 485–490. *Fig. 1–3.* 1921.—In a nursery of newly transplanted 2- and 3-year old seedlings of Engelmann spruce (*Picea Engelmanni*) and of Norway spruce (*P. excelsa*) a large percentage of the plants were destroyed with the formation of lesions at the base of the stems. The lesion on a stem first appeared near the surface of the soil on the south side, and never appeared on the north side until the stem was entirely girdled. It was noticed that in beds in which the plants had been set leaning toward the south the damage was much less than where they leaned toward the north. In 1918, 1919, and 1920 experimental plantings confirmed this observation. Temperature records showed that the surface soil in the nursery sometimes reached 154°F. The temperature at the base of plants leaning toward the south was consistently lower than at the base of those leaning toward the north. The loss from stem girdle was much reduced or entirely eliminated when the plants were set leaning toward the south.—*B. B. Higgins.*

4503. Snell, Walter H., and N. O. Howard. **Chemical injuries to white pines.** [Abstract.] Phytopathology **12**: 59. 1922.

4504. Stone, R. E., and J. E. Howitt. **Experiments with winter blight or streak of tomatoes.** [Abstract.] Phytopathology **12**: 41. 1922.

4505. Vincent, C. C. **Effects of miscible oil sprays.** Better Fruit 16^{11}: 9, 27–28. 1922. —A report is made on observations in Idaho of the killing of apple trees by miscible oil sprays applied late in the fall for the control of San José scale. The sprayed trees produced conspicuously small leaves and blossoms the following spring and died soon thereafter.—*A. E. Murneek.*

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

4506. Anonymous. **A spray schedule for Citrus.** Florida State Plant Bd. Quart. Bull. **5:** 159–160. 1921.—Spray materials and dates for control of the principal diseases of oranges and grapefruit are given in tabular form. This schedule is the result of a conference held at Orlando, Florida, in 1919.—*J. C. Th. Uphof.*

4507. Anonymous. **The Florida Plant Act of 1915.** Florida State Plant Bd. Circ. 42. *71 p.* 1921.

4508. Allen, W. J. **Orchard experiments. Spraying trials at Bathurst experiment farm.** Agric. Gaz. New South Wales **33:** 208–210. 1922.—Spraying experiments were conducted (1) to determine methods for control of black spot of apple (incidentally powdery mildew also), (2) to determine whether lime-sulphur containing the sediment passing through the strainer is as effective as the clear decanted liquid, and (3) to determine whether lime-sulphur kept in closed casks for different periods loses its efficiency. Black spot did not appear. Lime-sulphur gave as good control over mildew as atomic sulphur. Lime-sulphur not decanted gave the same results as decanted material. Lime-sulphur kept 2 months showed no deterioration but that kept 12 months showed some loss of efficiency. Details are given.—*L. R. Waldron.*

4509. Aumiot, J. **Sur le perfectionnement de la pomme de terre et sa résistance aux maladies. [Disease resistance and rejuvenation of the potato.]** Ann. Epiphyties **7:** 288–293. 1921.—Experiments with crossing potatoes and results from seed tests show that crossing and hybridization by artificial fertilization are the best means of renewing and perfecting our old races of potatoes and of obtaining varieties very superior from every point of view. Disease resistance, in particular, may be acquired by crossing with South American forms, wild or cultivated, which possess the desired immunity. The fertility of the hybrids facilitates these combinations.—*E. Foëx.*

4510. Barker, B. T. P. **The fungicidal action of sulphur.** Jour. Bath and West and Southern Counties Soc. **15:** 114. 1921.—A progress report is presented.—*J. I. Lauritzen.*

4511. Bastin, Harold. **Vegetable galls.** Jour. Bath and West and Southern Counties Soc. **15:** 30–56. *4 pl.* 1921.—Galls caused by insects, mites, eelworms, and fungi are treated (compilation). The following parasites and hosts are considered: Gall-causing eelworms: *Tylenchus fucicola* on strawberries (*Fragaria*), cucumber (*Cucumis sativis*), tomato (*Lycopersicum esculentum*), beet (*Beta vulgaris*), clover (*Trifolium* sp.), hop (*Humulus*), various cereals, and several wild plants; *T. devastatrix* on oats (*Avena sativa*), and clover (*Trifolium* sp.); *Heterodera radicicola* on cucumber (*Cucumis sativis*) and tomato (*Lycopersicum esculentum*); *Aphelenchus fragariae* and *A. ormerodis* on strawberry (*Fragaria*); *Tylenchus tritici* on marsh bent grass.—Galls caused by fungi: *Peridermium elatinum* on firs (*Abies* spp.); *Gymnosporangium clavariaeforme* on pear (*Pyrus communis*), juniper (*Juniperus* sp.), and common hawthorn and other species of *Crataegus*; *Exoascus* on peaches (*Prunus*); *Exoascus Pruni* on plums (*Prunus*); *Cystopus candidus* on cabbage (*Brassica oleracea*); *Synchytrium endobioticum* on potato (*Solanum*); *Plasmodiophora Brassicae* on Cruciferae; *Pseudomonas* on legumes; *Frankiella Alni* on alder (Alnus).—*J. I. Lauritzen.*

4512. Baybay, Domingo S. **Storage of some root crops and other perishable farm products.** Philippine Agric. **10:** 423–440. 1922.—Studies were made on the storage of root crops (gabi, ubi, sweet potato, tugui, cassava, yautia), fruits (pomelo, lemon, chico), and vegetables (squash, radish, endive). Records were kept of temperature and evaporation in each of the 5 types of structures used.—*Sam. F. Trelease.*

4513. Bergner. **Singular phenomena in the kingdom of plants.** Sci. Amer. Monthly **1:** 121–123. *Fig. 1–9.* 1920.—Witches' broom, "timber rose," and other malformations of plants caused by fungi, insects, and growth conditions are popularly treated.—*Chas. H. Otis.*

4514. Blodgett, F. M., and F. R. Perry. **Additions of formalin to maintain the concentration uniform with direct steam heat in the hot formaldehyde treatment of potatoes.** [Abstract.] Phytopathology 12: 39. 1922.

4515. Britton, W. E., M. P. Zappe, and E. M. Stoddard. **Results on apples and peaches in Connecticut.** Crop Protection Digest [Washington, D. C.] Bull. 1^2: 7–13. 1922.—Three dust mixtures, sulphur-nicotine, Sanders' copper, and sulphur arsenate, were used on apples in a comparison with lime-sulphur spray. Tabular data showing occurrence of diseases and insects in 3 orchards are provided. In all cases the highest percentages of good fruit were obtained on the sprayed plots. In a comparison of different spray materials on apples, dry lime-sulphur gave a much higher percentage of good fruit than did lime-sulphur, B. T. S., and Bordeaux mixture. A mixture of sulphur dust and arsenate of lead proved superior to atomic sulphur spray in the control of brown rot and scab on peaches.—*F. D. Fromme.*

4516. Burger, O. **Watermelon diseases.** Florida State Plant Bd. Quart. Bull. 5: 131–138. *Fig. 6–11.* 1921.—A popular consideration is presented with means of control of watermelon diseases in Florida, especially anthracnose and stem-end decay. Use of disease-free seed and disinfection of suspected seed with corrosive sublimate are recommended. Control of anthracnose may be obtained with 4–4–50 Bordeaux mixture, using about 100 gallons to the acre. The high-power sprayer should develop a pressure of 140–200 pounds. Vines and melons affected with stem-end decay should be removed; and wounds of fruit stems after harvesting should be treated with Bordeaux paste.—*J. C. Th. Uphof.*

4517. Burger, O. F., and A. C. Brown. **Some sweet potato diseases.** Florida State Plant Bd. Quart. Bull. 6: 71–76. 1922.—The demand for Florida-grown plants by farmers in other states is steadily decreasing on account of quality. The principal diseases of the sweet potato in Florida and methods for their control are considered, with special reference to those caused by *Fusarium batatatis*, *F. oxysporium*, *Sphaeronema fimbriatum*, *Plenodomus destruens*, and *Monilocheates infuscans*. Various southern states encourage the growing of certified sweet potato plants and seed in order to prevent the introduction into, and the spread within, their states of diseases attacking this crop.—*J. C. Th. Uphof.*

4518. Camp, A. F. **Convenient chambers for inoculation of plants where high humidity and moderate temperatures are required.** Phytopathology 11: 510–512. 1921.—Very satisfactory chambers were obtained by constructing muslin covered cages of the desired size, fitted with water connections to a Vermorel spray nozzle.—*B. B. Higgins.*

4519. Campbell, J. A. **Lemon culture. Diseases and insect pests.** New Zealand Jour. Agric. 23: 330–335. 1921.—The following diseases are discussed: brown rot (*Pythiacystis citrophthora*); verrucosis (*Cladosporium Citri*); melanose (*Phomopsis Citri*); anthracnose (*Phoma citricarpa*); grey-scab (*Sporodesmium griseum*); collar rot (*Fusarium limonis*); bark blotch (*Ascochyta corlicola*); sooty mould (*Capnodium citricola*); and mottle leaf. The insects listed are: cottony cushion scale (*Icerya purchasi*); black scale (*Lecanium oleae*); citricola scale (*Aspidiotus coccinens*); round black scale (*A. rossii*); a native scale (*Diaspis santali*); mealy bug (*Dactylopius adonidum*); black aphis (*Myzus cerasi*); leaf roller (*Tortrix excessana*); thrips; and borers.—*N. J. Giddings.*

4520. Cardinell, H. A. **One season's dusting against cucumber beetles and anthracnose of watermelons in Missouri.** Proc. Amer. Soc. Hort. Sci. 18: 123–130. 1921 [1922].—Excellent control of cucumber beetles was obtained in southeast Missouri by using a mixture of 1 pound arsenate of lead powder, ½ pound of Paris green, and 15 pounds of hydrated or air-slaked lime, applied as a dust. Good control was also obtained with various nicotine-carrying dusts. A mixture recommended by the Ohio Experiment Station containing 1 part calcium arsenate and 20 parts land plaster gave as good control as the arsenate of lead, Paris green, and lime mixture; but it did not kill so quickly as the latter mixture, and in addition produced considerable burning of the foliage. Dusting with a mixture of dehydrated copper sulphate and hydrated lime, 1-4, gave better control of watermelon anthracnose than did a mixture of dry Bordeaux and lime. Analyses showed that more copper adheres to the foliage after a rain when plants are dusted than when sprayed with liquid Bordeaux.—*H. A. Jones.*

4521. Cunningham, G. H. **Some recent changes in the names of plant diseases.** New Zealand Jour. Agric. **24:** 37–45. 1922.—Diseases of small fruits and vegetables are discussed.—*N. J. Giddings.*

4522. Dye, H. W., and A. G. Newhall. **Spraying and dusting for the bacterial and late blights of celery in western New York.** [Abstract.] Phytopathology **12:** 48. 1922.

4523. Edgerton, C. W. **Plant disease investigations at the Agricultural Experiment Station.** Louisiana State Univ. and Agric. and Mech. Coll. Univ. Bull. **13**^{7}: *18 p., fig. 1–7.* 1921.—A discussion is presented of the cause and importance of plant diseases with an outline of the work being carried on at the Experiment Station, including the results that have been obtained with the diseases of tomatoes, sugar cane, and corn.—*C. W. Edgerton.*

4524. Edgerton, C. W. **Sugar cane disease situation in 1921.** Louisiana Planter **68:** 159. 1922.—The mosaic disease is now present in all sections of the sugar district of Louisiana. It has not, however, damaged the sugar industry as severely as was predicted. It is estimated that the loss in badly infested districts is around 10 per cent. Other diseases mentioned are root rot, *Marasmius plicatus* Wakker; iliau disease, *Gnomonia iliau* Lyon; and red rot, *Colletotrichum falcatum* Went.—*C. W. Edgerton.*

4525. Feytaud, J. **Essais de bouillies mixtes pour le traitement des arbres fruitiers.** **[Experiments with mixed sprays on orchard trees.]** Ann. Epiphyties **7:** 195–236. *4 fig.* 1921. —The 2 generations of caterpillars of *Carpocapsa pomonella* L. destroy a portion of the apple and pear crop; serious damage is also caused at the beginning of the season, May–June, by Tenthredinidae larvae of the genus *Hoplocampa.* Treatment with a mixed spray (Bordeaux or lime-sulphur with the addition of arsenate of lead) protects the fruit both from these insects and from scab (*Venturia pirina* Aderh., *V. inaequalis* (Cke.) Aderh.). For combating the *Carpocapsa* and scab, the author advises the use of arsenate of lead in the ratio of 500 to 720 gr. (1 kg. to 1½ kg. of Billaut mixture), or lime-sulphur mixture of the density of 1.008 (corresponding to about 5 per cent of ordinary concentrated lime-sulphur spray), or Bordeaux mixture of 1 per cent of copper sulphate and from 3 to 5 per cent of slaked lime (or 1½ to 2½ unslaked lime).—Apple trees should be sprayed once within 10 days after the petals have fallen (end of blossming); pears, once within 10 days after the end of blossoming (the spray may be limited to the varieties susceptible to scab) and a second time, the principal application, on the same date as the apples.—Additional applications may be necessary either before or after blossoming, to combat severe attacks of other insects (*Anthonomus*, green worm, etc.) or threatened serious injury from scab.—The addition of arsenical salts intensifies the effect of fungicides on scab; even a simple spray of arsenate of lime is efficacious.—*E. Foëx.*

4526. Fisher, D. F. **Effect of alkaline sprays on the size of sweet cherries.** [Abstract.] Phytopathology **12:** 104. 1922.

4527. Fisher, D. F. **The parasitism of bastard toad flax (Comandra pallida A. DC.).** [Abstract.] Phytopathology **12:** 104. 1922.

4528. Foëx, E., et J. Dufrenoy. **Les principales questions de pathologie végétale qui ont été discutées devant la conférence de la pomme de terre, tenue à Londres en novembre 1921.** **[Potato diseases discussed at the London meeting of November 1921.]** Bull. Soc. Path. Vég. France **9:** 66–93. *1 fig.* 1922.—The paper includes discussions of mildew (*Phytophthora infestans* (Mont.) DeBy.), wart (*Synchytrium endobioticum* (Schilb.) Perc.), scab (*Actinomyces*), and the degeneration diseases.—*Edith K. Cash.*

4529. Frandsen, H. N. **Wilhelmsburger Kaalroe. [Wilhelmsburg kohlrabi.]** Vort Landbrug **41**: 71–73. 1922.—A kohlrabi, almost oval with light yellow head and fine yellow flesh, thought to have come from the Elba delta, has proved rather resistant to club-root (*Plasmodiophora Brassicae* Wor.) and as rich in dry matter as the earlier resistant strains. It is resistant to aphids and to a bacteriosis carried by them. The root is deep and difficult to harvest.—*Ernst Gram.*

4530. Giddings, N. J., and Anthony Berg. **Results in disease control in West Virginia.** Crop Protection Digest [Washington, D. C.] Bull. 1^2: 23–26. 1922.—Data showing results of applications of 3 dusting mixtures on apples are given. The small amount of fruit in the plots together with other factors made the results rather unsatisfactory.—*F. D. Fromme.*

4531. Gray, Geo. P. **The present status of lime-sulfur solution vs. dry material.** Monthly Bull. Dept. Agric. California **10**: 177–182. 1921.—A brief discussion of the controversy regarding the relative merits of the liquid and dry lime sulphur is followed by a review of some recent experiments involving the use of these 2 materials. Much uncertainty still exists regarding this point and further experimentation is necessary.—*E. L. Overholser.*

4532. Horne, W. T. **Some notes on two cars of grapefruit from the Isle of Pines.** [Abstract.] Phytopathology **12**: 106. 1922.

4533. Hunt, Rex N., and F. G. O'Donnell. **Soil temperatures obtained under a steam pan.** [Abstract.] Phytopathology **12**: 53. 1922.

4534. Kirby, R. S. **The improved rag-doll germinator box.** [Abstract.] Phytopathology **12**: 30–31. 1922.

4535. Lee, A. Strong. **Report of the Bureau of Plant Quarantine.** Monthly Bull. California State Dept. Agric. **10**: 614–626. 1921.

4536. Lovett, A. L. **What of the use of spreaders?** Better Fruit 16^8: 5–6, 26. 1922.—The most promising and practical substances tested as spreaders are: calcium caseinate, glue, gelatin, saponin, and oil emulsions. Of these, calcium caseinate has given by far the best results. Since 1921 a number of commercial concerns have put on the market various casein spreaders. Reviewing a large number of experiments and results of experiences with these spreaders by the leading authorities on the Pacific Coast, the author draws the following conclusions: (1) The addition of spreaders will increase the toxic efficiency of a poison spray; (2) it will spread a spray more evenly, resulting in a more uniform coloring of the fruit; (3) addition of spreaders to other than poison sprays seems equally desirable; (4) the cost of commercial caseinate is often prohibitive.—*A. E. Murneek.*

4537. Lyne, W. H. **Plant quarantine and transportation problems.** Monthly Bull. California Dept. Agric. **10**: 258–260. 1921.—Friendly cooperation between quarantine officials and transportation companies is essential. Shippers sometimes blame inspectors for damage and delay of shipments. The author states that in British Columbia such complaints are rare. Damages are often the fault of shippers who pack products poorly and improperly. Quarantine officials are called to disinfect storehouses, transportation cars, etc. Super-heating with high pressure steam or hot air, and use of deadly gases are the most important means of protection.—*E. L. Overholser.*

4538. McKay, M. B. **Potato diseases in Oregon and their control.** Oregon Agric. Exp. Sta. Circ. 24. *53 p., 37 fig.* 1922.—General control measures, including rotation, seed selection, seed disinfection, spraying, and storage conditions, are discussed. Features of the bulletin comprise a graph showing the relative value of each of the recognized control measures as applied to any particular disease, and a key for the identification of the various diseases.

Potato diseases are classified as (1) due to parasites, (2) due to unknown causes, and (3) due to climatic or environmental conditions. Each disease is briefly described and illustrated, and recommendations are given for its control.—*C. E. Owens.*

4539. Mackie, D. B. **Nursery stock quarantine.** Monthly Bull. California Dept. Agric. **10:** 271–277. 1921.—The author discusses methods for disinfecting nursery stock, including all the approved disinfectants. The general opinion seems to indicate that the vacuum fumigation method has proved most satisfactory because of the time saved and the thoroughness of the work. Hydrocyanic acid gas and carbon disulphide are the gases used.—*E. L. Overholser.*

4540. McMillan, H. G. **Potato-seed treatments in western states.** [Abstract.] Phytopathology **12:** 39. 1922.

4541. Mangin, Louis. **Parasites végétaux des plantes cultivées. [Vegetable parasites of cultivated plants.]** Pt. 2. *159 p., 61 fig.* Paris, 1921.—This work takes up in turn the diseases of the vine, of small fruits and tree fruits, and of industrial crops, and closes with a chapter on fungicidal preparations. Diseases are grouped according to the part of the host affected.—*Frederick V. Rand.*

4542. Montalto, Marco. **Sull'Orobanche della Fava. [Orobanche on the horse bean.]** Staz. Sper. Agrarie Ital. **54:** 466–468. 1921.—A short study is reported of the conditions existing in Sicily and the possible means for combating the parasitic *Orobanche speciosa* on *Faba.*—*A. Bonazzi.*

4543. Morstatt, H. **Bibliographie der Pflanzenschutzliteratur. Die Jahre 1914–1919. [Bibliography of plant protection literature.]** *viii+463 p.* Biologische Reichsanstalt Land- u. Forstw.: Berlin-Dahlem, 1921.—This work is a comprehensive bibliography of the literature published between 1914 and 1919 on plant pathology, using the term in its broadest sense. The citations are classified under several headings including: I. General pathological literature. II. Diseases and their causes, including diseases of unknown cause, non-parasitic diseases, diseases caused by bacteria, fungi and other cryptogams, phanerogams, and weeds; and animal enemies including lower animals, insects, and vertebrates. III. Diseases arranged according to host plants. IV. Plant protection and disease remedies. A table of contents and author index are appended.—*Frederick V. Rand.*

4544. Nicolle, M., et J. Magrou. **Les maladies parasitaires des plantes. [Parasitic diseases of plants.]** *199 p.* Masson & Co.: Paris, 1922.—The authors propose to "give a clear and reasonable interpretation of the mechanism of all plant diseases and to explain the multiplicity of functional troubles and lesions through the action of simple causes . . . "—Diseases due to animals, phanerogams, thallophytes, and bacteria are studied in 4 chapters each of which describes the principal diseases, the mechanism of infection, prophylaxis, and treatment. Chapter IV summarizes the present knowledge of bacterial diseases of which the pathogenic agents have been cultivated and successfully inoculated; an account is given of Erwin F. Smith's work.—The discussion concludes with a study of the general character of parasites and a general survey of parasitic diseases. Injury due to predatory species is distinguished from destruction and intoxication caused by parasites.—The subjects of immunity, intracellular destruction of parasites by means of antibodies, and the establishment of symbiotic equilibrium are explained by original observations.—*E. Foëx.*

4545. O'Byrne, F. M. **Standardized nursery inspection.** Florida State Plant Bd. Quart. Bull. **5:** 167–172. 1921.—The writer emphasizes the need of a uniform nursery inspection law in the U. S. A. The varying inspection laws are confusing and troublesome. On the other hand there are pests which are destructive in the South and ignored in the North, and vice versa. Various suggestions are given as to expiration of certificates, license fees for nurseries;

fumigation requirements, whether anything less than an inspection of every plant in a nursery will suffice for obtaining a certificate, and formulation of a uniform list of plants requiring dipping for all states.—*J. C. Th. Uphof.*

4546. O'Donnell, F. G. **Printing plate cultures.** [Abstract.] Phytopathology **12:** 53–54. 1922.

4547. O'Kane, Walter C. **The common ground of science and industry.** Crop Protection Digest [Washington, D. C.] Bull. 1^1: *10–16*. 1921.—A discussion is presented of the need for cooperation between the scientists and commercial organizations concerned with the protection of crops from diseases and insects. The plan of work and organization of the Crop Protection Institute, which is designed to effect such cooperation, is explained.—*F. D. Fromme.*

4548. Orton, C. R. **Cooperative dusting and spraying experiments in 1921.** Crop Protection Digest [Washington, D. C.] Bull. 1^2: *1–30*. 1922.—In an introductory statement the author discusses the organization, scope, and general features of the experiments. The details of the work are supplied by the cooperators under separate titles [see Bot. Absts. 11, Entries 3390, 4400, 4420, 4515, 4530, 4547].—*F. D. Fromme.*

4549. Orton, C. R. **The dissemination of plant diseases by seed.** [Abstract.] Phytopathology **12:** 54. 1922.

4550. Paillot, A. **Les traitements simultanés contre les maladies cryptogamiques et les insectes parasites des arbres fruitiers par les bouillies mixtes. [Spraying of orchard trees for fungous and insect pests.]** Ann. Epiphyties 7: 169–194. *Pl. 2.* 1921.—Mixed sprays should be used for: pear and apple scab (*Venturia pirina* Aderh. and *Venturia inaequalis* (Cke.) Aderh.), apple mildew (*Podosphaera leucotricha* (Ell. & Ev.) Salm.), pear rust (*Gymnosporangium sabinae* (Dicks.) Wint. in its aecial form, *Roestelia cancellata* Rebent.), as well as the following insects: *Carpocapsa* (apple and pear worm); *Cheimatobie* and *Hybernia defoliara, Hyponomeute, Euproctis chrysorrhaea, Bombyx neustria.*—The mixed sprays used were: (A) Copper-arsenical sprays. The copper salts may be formed by copper sulphate or copper acetate, the arsenical salts by arsenate of lime or arsenate of lead. (B) Lime-sulphur sprays. Commercial mixtures (4–5 per cent strength for spring treatments) with the addition of arsenate of lead or arsenate of lime. The 2 types of sprays are equally efficacious against the diseases and insects attacking pear and apple trees. The arsenical lime-sulphur mixtures are cheaper. In most cases 3 applications are enough to protect pears and apples against their chief spring parasites: (1) before flowering, when the flower buds are well developed; (2) at the end of flowering, when petals begin to fall; (3) 2 weeks later, when the fruits are well formed. Practical instructions are given for applying sprays.—*E. Foëx.*

4551. Park, Charles A. **The importance of plant quarantine.** Better Fruit 16^3: 12–13. 1921.—Due to the strict enforcement of quarantine measures in the Pacific Coast states, the following pests have been kept out of this region: the fruit and melon fly, gypsy and brown tail moths, pine blister rust, oriental peach moth, Japanese beetle, chestnut bark blight, filbert blight, European cane worm, Mexican cotton-boll weevil, and pink boll-worm of cotton, sweet potato weevil, potato wart, and citrus canker.—*A. E. Murneek.*

4552. Quanjer, H. M., et E. Foëx. **Mission d'études sur les maladies de la pomme de terre en France. [Mission for the investigation of the diseases of the Irish potato in France.]** Ann. Epiphyties 7: 267–280. 1921.—The phenomena of degeneration should be attributed to diseases perpetuated by seed tubers.—Field inspection organised in Holland by the Grandes Sociétés Agricoles permits an exact and complete estimate of the value of a strain of seed. The government of the Netherlands places the directors of the Services Agricoles at the disposal of the agricultural societies and charges the professors of the University of Wageningen with the study of the problems arising from this field inspection. This study is directed by state officials but carried out in each province by employees of the Services Agricoles. —The Dutch law in regard to plant diseases (July 17, 1921) allows remedies or means of destruction to be prescribed if certain plant diseases or harmful animals become dangerous to cultivated crops, for example *Synchytrium endobioticum* (Schilb.) Percival.—The Dutch government makes grants to certain plant breeders, such as M. Veenhuizen.—The sanitary situation of fields in France visited by Quanjer and Foëx during July, 1920, is described. Measures for guarding against the danger from potato degeneration are: (1) judicious choice of seed; (2) selection, following the Dutch method; (3) trial of French and foreign varieties.—*E. Foëx.*

4553. Rhoads, Arthur H. **The occurrence and development of pathological resin canals in the Coniferae.** [Abstract.] Phytopathology **12**: 59–60. 1922.

4554. Smith, Ralph E. **Sour sap, brown rot and winter injury.** Associated Grower **3**^{1}: 16–17. 1922.

4555. Spegazzini, Carlos. **Sobre algunas enfermedades y hongos que afectan las plantas de "agrios" en el Paraguay.** [Diseases and fungi that affect citrus plants in Paraguay.] An. Soc. Cien. Argentina **90**: 155–188. *Fig. 1–14.* 1920.—The author describes 5 diseases of citrus plants such as he studied in Paraguay during the year 1919. (1) Rhyzosepsis or powdery root. *Citrus deliciosa* Ten. is most susceptible to this disease, which the author describes in detail. No organism of a definite nature has been isolated as the causal agent. (2) Gummosis. This disease was found by Spegazzini upon *Citrus aurantium* Rss., *C. limetta* Rss., *C. medica* Rss., *C. limonum* Rss., *C. deliciosa* Ten., as well as upon *Mangifera indica*, *Rheedia brasiliensis*, *Santalum album*, and *Eugenia jambos*. *Citrus bigaradia* Rss., or bitter orange, was found to be completely immune, or nearly so. A detailed description of the disease and its various stages is given. (3) Curly leaf. This disease attacks *Citrus limonun* Rss., *C. medica* Rss., *C. aurantium* Rss., but seldom *C. limetta*. *Cladosporium aurantii* Massee was found by Spegazzini but he is inclined to consider this fungus as a secondary invader inoculated by the punctures of parasitic microzoons. (4) Smut. This disease attacks *Citrus deliciosa* Ten., but not *C. aurantium* Rss., or *C. bigaradia* Rss. Other plants, such as *Coffea arabica*, *Anona squamosa*, *Psidium pomiferum*, *Ilex paraguariensis*, *Rheedia brasiliensis*, and *Persea gratissima* are affected. In the opinion of the author this disease is of a secondary nature and dependent upon the invasion of the plant by coccids. The forms found are given as follows: *Mytilapsis citricola*, *Aspidiotus hederae*, *Aonidiella aurantii*, *Chrysamphalus ficus*, *Lepidosaphes horridus*, *Lecanium hesperidum*, *L. oleae*, *Ceroplastes* sp. The most abundant form was *Fumago oosperma* Speg. (5) Explosive leprosy (Lepra explosiva). This is a disease due to infection by *Pseudhaplosporella aurantiorum* Speg., which during the 1st period of invasion is evident on the young, 1-year, twigs and which propagates centripetally during the 2nd period of extension and defoliates the tree during the 3rd period of basifugal propagation. During the 3rd period, nodules are formed along the trunk and older branches (*Nodulos neoplasmicos*) reaching into the librum and spreading extensively. Secondary invaders are *Ephelidium* sp. and **Amylirosa** *aurantiorum* Speg., n. gen. Botanical descriptions are given of many forms, among which the following are described and pictured: *Odontia incrustans* n. sp., *Eutypella pusilla* n. sp., *Eutypa paraguaya* n. sp., *Cryptosporella aurantiicola* n. sp., *Ustulina brachyspora* n. sp., *Didymella aurantiiphila* n. sp., *Melanomma aurantiicola* n. sp., *M. aurantiiphila* n. sp., *Lophidiopsis paraguayensis* n. sp., **Amylirosa** *aurantiorum* n. gen. n. sp., *Macrophoma paraphysata* n. f., *Chaetophoma stromaticola* n. f., *Rhabdospora hesperidica* n. f., **Pseudhaplosporella** *aurantiorum* n. gen. n. sp., and **Pseudodiplodia** *aurantiorum* n. gen. n. sp.—*A. Bonazzi.*

4556. Stevens, H. E. **Spraying for avocado diseases.** Proc. Florida State Hort. Soc. **1921**: 69–74. 1921.—The 3 diseases most troublesome on the Florida avocado are black spot, avocado blotch, and avocado scab. Sprayings made in April and May were most effective in reducing black spot and blotch, while the bloom-spray hardly seems necessary. These two diseases are controlled by 2 timely applications of 4–4–50 Bordeaux mixture: (1) when the fruit is well set, and (2) 3–4 weeks afterward. For avocado scab the bloom-spray seems to be essential. The 1st application should be made the latter part of the bloom period; the 2nd, 3–4 weeks later; and the 3rd, 3 weeks after the 2nd. The 3–3–50 Bordeaux mixture is sufficiently strong for scab.—*J. C. Th. Uphof.*

4557. Stuart, William. Potato problems. Rept. Maryland Agric. Soc. 6: 318–326. 1921 [1922].—In a paper read before the Maryland Vegetable Growers' Association the author discusses seed certification, disease control, insect and animal control, storage and marketing problems, and the development of disease-resistant varieties.—*H. A. Jones.*

4558. Urbahns, T. D. Spraying the peach tree. Associated Grower. 2^{10}:18. 1921.

4559. Vermoesen, Cam. **Eenige belangrijke ziekten onzer Congoleesche kulturen. 4. Ziekten van den Oliepalm. (Elaeis guineensis.) (Vervolg.) [Some important diseases of our Congo crops. 4. Diseases of the oil palm (Elaeis guineensis).]** Natuurwetenschapp. Tijdschr. 3:79–83. 1921.—Some insect and fungous enemies of the oil palm (*Elaeis guineensis*), *Funtumia elastica*, banana, and cotton are listed.—*C. D. La Rue.*

4560. Whitten, J. C. **Spraying peach orchards.** Associated Grower 2^{11}:6. 1921.

4561. Wolf, Frederick A. **Report of the division of plant pathology and bacteriology.** Ann. Rept. North Carolina Agric. Exp. Sta. 42: 67–68. 1921.—Formal statements are made bearing on soybean blight, rust resistance in wheat, and studies in the physiology of bacterial plant pathogens.—*F. A. Wolf.*

PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

Heber W. Youngken, *Editor*
E. N. Gathercoal, *Assistant Editor*

(See also in this issue Entries 3298, 3350, 3359, 3394, 3602, 3616, 3628, 3758, 3935, 3946, 4267, 4643, 4654, 4708, 4848, 4873, 4878)

4562. Anonymous. **Utilización de las hojas y la pulpa del café. [Utilization of the leaves and pulp of coffee.]** Rev. Agric. Com. y Trab. [Cuba] 5^2:25. 1922.—An extract from the Brazilian journal "A Lavoura" indicates the commercial value of leaves and pulp of coffee, at present considered of no value. The leaves contain such substances as acids, oils, and albumin, and more caffeine than does tea. The pulp is also of great value in this connection.—*G. R. Hoerner.*

4563. Annett, H. E. **The effect of environmental factors on the alkaloidal content and yield of latex from the opium poppy (Papaver somniferum) and the bearing of the work on the functions of alkaloids in plant life.** Mem. Dept. Agric. India Chem. Ser. 6:61–154. *Pl. 1–7.* 1921.—The influence of the number of capsules in the plant, the age of capsules, the application of manures, starvation, climate, season, and weather conditions on the alkaloidal content and yield of latex are studied. Morphine in the opium poppy is a useless end-product of metabolism. The plant, having no mechanism for excreting an end-product of such complicated structure, stores it in places where it can do no harm to its own metabolism, i. e., chiefly in the capsule. The lactiferous system would seem to represent a means of removing waste products of metabolism.—*J. Sen.*

4564. Annett, H. E., H. D. Sen, and H. D. Singh. **Non-environmental factors influencing the alkaloidal content and yield of laatex from the opium poppy (Papaver somniferum).** Mem. Dept. Agric. India Chem. Ser. 6:1–60. *1 pl.* 1921.—The content of morphine, codeine, and narcotine in the latex and its yield obtained at different lancings and by different methods of incision are compared. The opium obtained at 1st lancing of a poppy capsule is richer in morphine than that of successive lancings.—*J. Sen.*

4565. Calvino, Eva Mameli de. Los pelos urentes de la Pica Pica. [The stinging hairs of Mucuna pruriens.] Rev. Med. Cubana 33: 1–16. *6 fig.* 1922.—The author first describes the aerial portion of *Mucuna pruriens* as found in Cuba, Porto Rico, and the other Antilles. The microscopical characteristics and constituents of the stinging hairs are then taken up after which a comparison is made between the hairs of *Stizolobium capitatum* (velvet bean) and *Mucuna pruriens.* The article concludes with the therapeutic properties, constituents of the seed, and treatment of the itch produced by the hairs. The author states that the hairs of the fruit of *Stizolobium capitatum* differ from those of *Mucuna pruriens* by the absence of hooks and mineral incrustations in the cuticular membrane.—*H. W. Youngken.*

4566. Calvino, Eva Mameli de. Tres Euforbiaceas tropicales urentes. [Three tropical burning Euphorbias.] Rev. Agric. Com. y Trab. [Cuba] 5^3: 11–15. *7 fig.* 1922.—*Platygyna urens* Mercier (*P. pruriens* Baill., *P. hexandra* Muell.) from Cuba, *Tragia volubilis* L. from the West Indies, and *Jatropha urens* L. (*J. stimulosa* Michx.) are discussed. Botanical descriptions of the plants and morphological descriptions of the hairs, their chemical constituents, and the mechanical action by means of which the human epidermis is penetrated and the irritant acid injected are given.—*G. R. Hoerner.*

4567. Cecil, George. The Indian chemist's shop. Pharm. Era 55: 211–212. 1922.—The native establishments and wares are compared with those which have come under European influence.—*C. M. Sterling.*

4568. Chow, M. H. Drug topics. Observations on commercial Star Anise. Jour. Amer. Pharm. Assoc. 11: 17–19. 1922.—After ascertaining the ratio of the several parts of the fruit of commercial Star Anise, the different parts were examined as to moisture, ash, and ether extract contents. Data on the ratio of parts, as well as the analyses are presented in tabulated form.—*Anton Hogstad, Jr.*

4569. Clevenger, Joseph F. A report on the Zamia starch situation. Amer. Jour. Pharm. 94: 98–103. *Pl. 1.* 1922.—[See Bot. Absts. 11, Entry 427.]

4570. Cremata, Merlino. Algunas plantas cáusticas, rubefacientes o vesicantes. [Some caustic, rubifacient or vesicant plants.] Rev. Agric. Com. y Trab. [Cuba] 5^1: 24–26. 1922.—The medicinal value of the following plants grown in Cuba, either native or introduced, is listed: *Comocladia dentata* Jacq., *Metopium Brownei* Uub., *Mucuna pruriens* DC., *Plumbago scandens* Lin., *Hura crepitans* Lin., *Urera baccifera* Gaud., *Jatropha urens* var. *inermis, Euphorbia lactea* Haw., *Tabernaemontana citrifolia* Jacq., *Monstera deliciosa* Liebm., *Dieffenbachia seguina* Sch., *Anacardium occidentale* L., *Zingiber officinale* Juss., *Piper umbellatum* Lin., *Clematis havanensis* Kth., *Genipa americana, Guilandina Bonduc, Moringa pterygosperma, Caesalpinia bahamensis.*—*G. R. Hoerner.*

4571. Crockett, W. G. Investigation of purified siliceous earth. Jour. Amer. Pharm. Assoc. 11: 84–86. 1922.—Analytical data are presented on 8 samples of Kieselguhr, purchased from wholesalers in the U. S. A., not one of which conforms to the requirements of the U. S. P.—*Anton Hogstad, Jr.*

4572. Farwell, Oliver A. Hollyhock root (?) for Althaea. Jour. Amer. Pharm. Assoc. 11: 184. 1922.—A case is reported of the substitution for *Althaea* of the root of some Malvaceous plant closely related to *Althaea*, probably that of *Althaea rosea* (Hollyhock). Superficially the substitute bears a strong resemblance to the official drug, is of about the same size, and is covered with loose bast fibers; it is lighter colored, the longitudinal ridges are not so prominent, the grooves broader and shallower or entirely absent; the cambium zone is circular whereas in *Althaea* it is angular; the wood groups are less numerous, but larger, the largest forming concentric circles.—*Anton Hogstad, Jr.*

4573. Farwell, Oliver A. **Source of balsam poplar buds.** Jour. Amer. Pharm. Assoc. **11:** 184–185. 1922.—According to the N. F. IV, balsam poplar buds are derived from *Populus nigra* L. or *P. balsamifera* L., the latter according to the author is interpreted as currently but wrongly applied to the northern balsam poplar, the proper name for which is *P. Tacamcahacca* Mill. The botanical source of balsam poplar buds is investigated and reported on as follows: Carolina poplar or cottonwood being that of *P. balsamifera* L. and not the northern balsam poplar; that balsam poplar buds are derived from *P. Tacamcahacca* Mill., *P. candicans* Ait., and *P. balsamifera* L. The author states that he has seen nothing on the market that might be classed as having been derived from *P. nigra* L.—*Anton Hogstad, Jr.*

4574. Galavielle, L., et P. Cristol. **Le Scilla autumnalis L. Étude chimique de ses principes actifs.** [**Scilla autumnalis L. Chemical investigation of its active principles.**] Bull. Sci. Pharm. **24:** 29–31. 1922.—The chemistry of squill is still in its infancy and quite a number of compounds have been isolated from the bulb. From *Scilla autumnalis*, a plant growing in the French part of the Mediterrenean basin which blooms in August and September, attains a height of 10–20 cm. and possesses an underground bulb 1–2 cm. in thickness and 2–3 cm. in length, the authors succeeded in isolating scillopicrine, scillotoxine, and scilline, substances also present in the official squill, *Scilla maritima*.—*H. Engelhardt.*

4575. Goodson, J. A. **Constituents of the leaves of Helinus ovatus.** Trans. Chem. Soc. **117:** 140–144. 1920.—*Helinus ovatus* is the 1st species of this genus to be examined. Its leaves are found to contain aconitic acid, quercetin, a saponin, and scyllitol. The occurrence of the last-named substance in these plants is of considerable biological value.—*M. Levine.*

4576. Goris, A., et H. Deluard. **Étude de l'influence des radiations solaires sur la culture de la belladonne et la formation des alcaloides dans les feuilles.** [**Investigation of the influence of sunlight on the cultivation of belladonna and the formation of the alkaloids in the leaves.**] Bull. Sci. Pharm. **24:** 74–76. 1922.—Sunlight appears to have a great influence on the development of belladonna. Plants grown in full sunlight yielded 2 crops of leaves which assayed 0.65 and 0.52 per cent respectively of alkaloids, while plants grown in the shade yielded only 1 crop which assayed 0.42 per cent of alkaloids. While plants grown in sunlight yielded 19 gm. of dry leaves, plants grown in the shade yielded only 9 gm. Therefore, the former yield about 4 times the quantity of dry leaves. There is no marked difference in the amount of extractive matter in the 2 kinds of leaves.—*H. Engelhardt.*

4577. Groszfeld, J. **Die Bestimmung der Stärke in Wurstwaren.** [**Estimation of starch in sausages.**] Zeitschr. Untersuch. Nahrungs- u. Genussmittel **42:** 29–31. 1921.—Flesh and fat are removed by treatment with alcoholic potash and the remainder filtered through a special apparatus which is described and figured. The mass is washed with alcohol, drained, agitated with 25 per cent hydrochloric acid, filtered, and the starch-content determined by polarization of the filtrate.—*E. E. Stanford.*

4578. Henry, Max. **Feeding and contact experiments with St. John's Wort.** Agric. Gaz. New South Wales **33:** 205–207. 1922.—Steers and sheep were placed in a paddock without shelter, the vegetation consisting almost entirely of St. John's Wort (*Hypericum perforatum*) not yet in flower. Eight days later lesions were present on the steers and there was marked evidence of intense irritation with excoriations. The sheep were also markedly affected. When the animals were removed rapid recovery followed. Muzzled animals placed in the paddock remained healthy, indicating that contact alone has no ill effects.—*L. R. Waldron.*

4579. Henry, Max. **Some feeding experiments with allegedly poisonous plants.** Agric. Gaz. New South Wales **33:** 341–346. 1922.—Feeding experiments with sheep were carried on with the following plants: *Solanum escuriale*, *Echium plantagineum* (Patterson's curse), *Myoporum deserti* (dogwood poison bush), and *Swainsona affinis*. Results from feeding were all quite negative so far as toxic properties are concerned, under the conditions of the experiment.—*L. R. Waldron.*

4580. HENRY, T. A. **Hyenanchin and other constituents of Hyenanche globosa, Lamb.** Trans. Chem. Soc. 117: 1619–1625. 1920.—*Hyenanche globosa* Lamb. (*Toxicodendron capense* Thun.) yields hyenanchin and isohyenanchin. The former substance has been determined by physiological methods to be toxic and has an action almost identical with picrotoxin; isohyenanchin is not toxic in such doses as can be injected intravenously.—*M. Levine.*

4581. HIXON, RALPH M. **Phytochemical notes. Oil of catnip.** Jour. Amer. Pharm. Assoc. 11: 96–98. 1922.—Data on the density, specific volume, and solubility in 70, 80, and 90 per cent alcohol are given for a lot of oil of catnip distilled during 1915 and 1916. A preliminary determination of the saponification value, by E. R. Miller, which turned out very high, led the author to suspect the presence of lactone. He removed the lactone from the original oil, and made an examination of the non-lactone oil, in which, he states, the typical odor of catnip resides and which constitutes but a small fraction of the oil. He assumes that the peculiar catnip odor is due primarily to an acetic ester of an alcohol present only in small amount. The principal fraction of the non-lactone oil, namely 245°–255°, had a sesuiterpene odor; $d_{23°}$ 0.912, $\alpha_{D22.5°}$–10.61°; $n_{D23°}$ 1.494; hence a molecular refraction of 65.08. According to density it belongs to the dicyclic sesquiterpenes; according to molecular refraction between the dicyclic and tricyclic. The fractions tested were too small and impure to afford any satisfactory results as to the identification of the oil by various tests.—*Anton Hogstad, Jr.*

4582. HOWARD, J. W. **Some constituents of the mountain balm.** Jour. Amer. Pharm. Assoc. 11: 19–21. 1922.—Analytical data are presented on the moisture, ash crude protein, crude fiber, and petroleum-ether-extract content of the leaves of *Ceanothus velutinus* Douglas, previously dried at room temperature for 1 month. The extracted fragrant exudation yielded a volatile oil, a resin, and cinnamic and stearic acids on hydrolysis; it may be properly classed as a balsam.—*Anton Hogstad, Jr.*

4583. KEILHOLZ, A. **De opsporing van eenige metalen en van arsenicum in plantaardige en menschlijke organen. [The detection of some metals and of arsenic in some vegetable and human organs.]** Pharm. Weekbl. 58: 1482. 1921.—In addition to various human organs some plants were examined and it was found that the leaves of cherry laurel contained arsenic, copper, manganese, zinc, aluminum, and lithium. The same metals were present in the leaves of *Hedera helix;* linseed and brown beans contained arsenic, copper, zinc, and aluminum; green peas, arsenic, copper, and lithium; and wheat, arsenic, manganese, and lithium.—*H. Engelhardt.*

4584. LAWRENCE, WILLIAM E. **The principal stock-poisoning plants of Oregon.** Oregon Agric. Exp. Sta. Bull. 187. *42 p., 2 pl. 10 fig.* 1922.—The poisonous plants of Oregon are divided into 2 groups, namely, the principal poisonous plants and the minor poisonous plants. The 1st group includes larkspur (6 species), death camas, water hemlock, lupines, loco (*Astragalus lentiginosus* Dougl.), and common bracken fern. The 2nd group comprises 18 species of shrubs and herbaceous plants and several forms of fungi.—The bulletin includes a chart of the 6 principal poisonous plants showing distribution, season of greatest danger, and suggestions for preventing loss of stock.—A general discussion is given including the following topics: extent of poisoning in Oregon, conditions affecting stock-poisoning, prevention of poisoning, diagnosis, and remedies.—*C. E. Owens.*

4585. MARSH, C. D., and A. B. CLAWSON. **The Death Camas species, Zygadenus paniculatus and Z. elegans, as poisonous plants.** U. S. Dept. Agric. Bull. 1012. *25 p., pl. 1–3, fig. 1–5.* 1922.—Compared with *Zygadenus gramineus*, *Z. paniculatus* is about ½ as toxic, and *Z. elegans* about $\frac{1}{7}$. *Z. paniculatus* is the cause of heavy losses of live stock but *Z. elegans* probably does little or no damage under practical range conditions.—*Ira C. Swanman.*

4586. Maurin, E. **Variations des composés oxyméthyl anthraquinoniques dans la bourdaine et ses préparations galéniques. [Variation of the oxymethylanthraquinone compounds in buckthorn bark and its galenical preparations.]** Bull. Sci. Pharm. 24: 175–180. 1922.—Investigations showed that the amount of active principle, i.e., the anthraquinones, combined in the form of glucosides decreases with the age of the bark, and that barks grown in different countries contain practically the same amount of anthraglucosides. Young twigs contained 0.3 per cent of free and 1.4 per cent of total, i.e., free and combined, oxymethyl anthraquinones, while the respective percentages for 3-year old stems were 0.85 and 2.7, and for 6-year old trunks, 1.25 and 1.85.—*H. Engelhardt.*

4587. Moreno, Eduardo. **El agua de coco. [Coconut-milk.]** Rev. Agric. Com. y Trab. [Cuba] 5^1: 6–7. *1 pl.* 1922.—Chemical studies show this substance to be highly nutritive and easily digested. It has diuretic properties as well. The use of coconut-milk is suggested in the preparation of diets for invalids where the more common fruit juices cannot be administered.—*G. R. Hoerner.*

4588. Peacock, Josiah C., and Bertha L. De G. [Peacock]. **Some notes on the astringencies of Red Rose and Pale Rose.** Jour. Amer. Pharm. Assoc. 11: 90–93. 1922.—The authors have continued their experiments on the astringent principle of the rose, the question of the Pale Rose being discussed in this paper. From their experiments, the authors state there is every reason to believe that the astringent substance is present in both the Red and the Pale Rose, but in smaller quantity in the latter. It was also found that the crystalline substance obtained from the infusion of Red Rose, upon which mildew had been allowed to grow, could also be obtained from the Pale Rose in like manner. It is possible that this crystalline substance is related to the astringent principle.—*Anton Hogstad, Jr.*

4589. Penick, S. B. **Crude drugs in trade and medicine.** Pharm. Era 55: 209–210. 1922.—Brief statements are made concerning the number of crude drugs used in the U. S. A., foreign and domestic supplies; gathering domestic drugs and determining their quality.—*C. M. Sterling.*

4590. Raebiger. **Verwertung der Pilze zu Fütterungszwecken unter besonderer Berücksichtigung der giftigen und giftverdächtigen Schwämme. [Use of fungi as feed with special reference to the poisonous or possibly poisonous mushrooms.]** Mitteil. Deutsch. Landw. Ges. 37: 367–370. 1922.—The author cites various authorities to show that fungi poisonous to man are not poisonous to domestic animals. He also carried out feeding experiments with rabbits, guinea pigs, goats, hogs, and poultry. Fresh poisonous mushrooms, among them 3 species of *Amanita,* as well as cooked ones were eaten by rabbits, guinea pigs, poultry, and doves without injury. Various other poisonous species, such as *Inocybe* sp., *Lactaria vellerea,* were fed without injury. Goats and 1 sheep were fed mixed poisonous and edible mushrooms as well as poisonous ones only (*Amanita*) and showed no signs of illness. Hogs refused fresh mushrooms of any kind; both poisonous and edible species were eaten when cooked. In some cases, when fed large quantities of poisonous species only, there was some illness but the animals quickly recovered; there were no deaths. The author advocates the collection and feeding of cooked mixed mushrooms without regard to whether poisonous to man or not. A ration of mushroom meal made of mushrooms not edible for man was fed to 2 horses. The author concludes that the feeding value was about that of wheat bran.—*A. J. Pieters.*

4591. Rock, Joseph F. **The Chaulmoogra tree and some related species: a survey conducted in Siam, Burma, and Bengal.** U. S. Dept. Agric. Bull. 1057. *29 p.* 1922.—The introductory chapter is by David Fairchild, who reviews briefly the history of the uses of Chaulmoogra oil and its value as a specific in the treatment of leprosy. Chemistry of Chaulmoogra, Hydnocarpus, and Gynocardia oils is discussed in a chapter by Frederick B. Power, who gives definitions, physical and chemical properties, etc. Gynocardia oil is not synonomous with Chaulmoogra oil as generally believed prior to 1900. *Hydnocarpus anthelminthica*, *H. castanea*, *H. curtion*, *Taraktogenos Kurzii*, *Asteriastigma macrocarpa*, and *Gynocardia odorata* were studied by the author and their seed collected in their native habitats, which are described and illustrated. This survey shows that the dealers in Chaulmoogra oil have never seen the tree in its wild state, but these as well as the native Bengal dealers in Chittagong depended on more or less indolent jungle people for collecting the seed. The seed of the true Chaulmoogra, *Taraktogenos Kurzii*, are known by different native names in the various regions in which they grow. The Burmese name Kalaw is applied to more than 1 species, which resemble each other so closely that the jungle people make no distinction between them. The Kalaw of the markets and bazaars is a mixture of fruits from several species, from which manufacturers obtain Chaulmoogra oil. At least 50 per cent of the crop is lost every year owing to conditions under which seed are collected. *Taraktogenos Kurzii* and kindred species do not bear a regular yearly crop, but fruit sporadically and sometimes are without fruit for 2 years or more. Causes of irregular fruiting are not known but the fact that the trees are polygamous is thought to have something to do with this. Little is known of flower and fruiting of these species, some of which may be biennial fruiters. The suggestion has been made that plantations of *Taraktogenos Kurzii*, which is known to yield true Chaulmoogra oil, should be started, and also of such species of *Taraktogenos*, *Hydnocarpus*, and *Asteriastigma* as yield oils of similar composition, since the estimated yearly demand of 1,000,000 l. of oil will make it certain that the demand will far exceed the output. Seeds secured by the author are now growing in several places. Suggestions are given regarding cultural and soil requirements for establishing plantations of *Taraktogenos Kurzii*.—The Sibpur Botanic Garden herbarium, the repository of King's types, contains possibly 15 undescribed species of either *Hydnocarpus* or *Taraktogenos* with detailed information as to habitat and locality. The author urgently recommends a thorough survey of all known species and that the botanical discussion of the subject, together with the results of chemical examination of the material, be issued as a monograph on the tribe Panigieae, family Flacourtiaceae.—*J. T. Buchholz.*

4592. Safford, W. E. **Peyote, the narcotic mescal button of the Indians.** Jour. Amer. Pharm. Assoc. 11: 93–96. 1922.—The nomenclature, history, and physiological effects of Peyote, the narcotic mescal buttons of the Indians, are discussed. Peyote is a small, fleshy, spineless, cactus (*Lophophora Williamsii*), which has been used for centuries by aboriginal Americans in religious rituals, and as a magic plant believed to have the power of inducing supernatural visions. It was first referred to the genus *Echinocactus*, afterward to *Anhalonium*, and was finally made the type of a new genus, *Lophophora*. Only 1 species, *L. Williamsii*, is used by the Indians. It is hypnotic in character, causing hallucinations, but its effect is quieting and there is no tendency to commit acts of violence. It is now used, as it was 4 centuries ago in Old Mexico, in certain ceremonials. An historical account is included in the paper; also an acccunt of other narcotics and intoxicants used by the Indians.—*Anton Hogstad, Jr.*

4593. Sch. **Giftigkeit der Eibe.** [**Poisoning by yew.**] Deutsch. Forstzeitg. 37: 214–215. 1922.—Needles of the yew (*Taxus*) are very poisonous to horses, sheep, and other domestic animals, 180–200 gm. being sufficient to kill a sheep or horse. Besides formic acid, they contain a very poisonous alkaloid, taxon. Deer and rabbits seem not to be affected by it.—*W. N. Sparhawk.*

4594. Tanret, G. **Recherches sur l'ergot de diss et sur l'ergot d'avoine.** [**Investigations of ergot of diss and of oats.**] Bull. Sci. Pharm. 24: 169–175. 1922.—Chemical investigations of the ergot produced on *Ampelodesmos tenax* Linck, or *Arundo festucoides* Desfontaines, showed that while both in this ergot and that of oats the same active principles are present, the amount, especially of those of alkaloidal nature, are smaller in ergot of diss than in ergot of oats. The author, however, believes that ergot of diss, which is a plant growing abundantly in Algeria, may eventually become a marketable article.—*H. Engelhardt.*

4595. Thomson, R. B., and H. B. Sifton. **A guide to the poisonous plants and weed seeds of Canada and the northern United States.** *151 p., 40 fig.* University of Toronto Press: Toronto, 1922.—This is primarily a text book on poisonous plants, divided into 4 sections. In the first 3 sections are included the plants mainly responsible for fatalities among animals, grouped on the basis of their source in the animals' feed, whether found in hay (Section 1), in pasture (Section 2) or in concentrated feedstuffs (Section 3). In Section 4 are grouped the plants that, although poisonous, rarely cause the death of animals. Plants mainly responsible for poisoning in man are also enumerated in this section.—*Mary R. Burr.*

4596. Viehoever, Arno. **Report on medicinal plants.** Jour. Assoc. Official Agric. Chem. **5**: 155–163. 1921.—The report includes detection of molds in drugs, foods, and spices by means of the chitin test; identification and differentiation of plants and plant products by means of the pollen grains; value of weights of unit volumes or the specific weight of crude drugs and spices; important adulterants and substitutes of crude drugs and spices.—*F. M. Schertz.*

4597. Viehoever, Arno, and Joseph F. Clevenger. **Domestic and imported veratrum (Hellebore), Veratrum viride Ait., Veratrum californicum Durand, and Veratrum album L. II. Chemical studies.** Jour. Amer. Pharm. Assoc. **11**: 166–174. 1922.—The authors have continued the work on the different species of *Veratrum* [see Bot. Absts. 11, Entry 699] in an unsuccessful attempt to obtain a differentiation of *Veratrum album* and *V. viride* by chemical means. The paper deals with the amount of alkaloids occurring in the 2 commercial forms, the nature of the alkaloids present, and the total and acid-insoluble ash contents. The work of previous investigators is included in tabulated form. On account of this close relationship of *V. album* and *V. viride*, the authors suggest adopting the same standards for the 2 species, namely, at least 1 per cent for alkaloids, and not more than 8 per cent total nor more than 4 per cent acid-insoluble ash. The method for estimating Veratrum alkaloids is given; also some notes on the pharmacological characteristics of these 2 drugs. A bibliography is appended.—*Anton Hogstad, Jr.*

4598. Wester, D. H. **Microchemisch onderzoek naar de anwezigheid van alcaloiden en looistoffen in enkele Orchideae. [Microchemical examination of the presence of alkaloids and tannates in some Orchideae.]** Pharm. Weekbl. **58**: 1438–1442. *Pl. 1, fig. 3.* 1921.—The examination of 33 cultivated species of Orchideae revealed the fact that none contained tannates. In 1 species, *Phalaenopsis amabilis*, larger quantities of an alkaloid were found, while 2 other species, *P. Lüdemannia* and *P. chysis braetescens* contained only traces of bases.—*H. Engelhardt.*

4599. Wieland, H. **Über die Alkaloide der Lobelia Pflanze.** [Concerning the alkaloids of Lobelia plants.] Ber. Deutsch. Chem. Ges. **54**: 1784–1788. 1921.—Two alkaloids, namely lobelin ($C_{23}H_{29}O_2N$) and lobelidin ($C_{20}H_{25}O_2N$), were isolated and physical properties determined.—*Henry Schmitz.*

4600. Williams, Roger C. **Preparation of synthetic guaiacol.** Pharm. Era **55**: 135–136. 1922.

PHYSIOLOGY

B. M. Duggar, *Editor*

W. J. Robbins, *Assistant Editor*

(See also in this issue Entries 3274, 3286, 3291, 3305, 3322, 3337, 3340, 3357, 3359, 3375, 3403, 3410, 3722, 3739, 3767, 3783, 3462, 3463, 3464, 3467, 3469, 3471, 3486, 3494, 3632, 3796, 3797, 3842, 3881, 3912, 3917, 3936, 3989, 4004, 4010, 4084, 4195, 4196, 4200, 4201, 4207, 4214, 4222, 4224, 4261, 4264, 4307, 4314, 4352, 4375, 4385, 4396, 4397, 4423, 4430, 4461, 4492, 4495, 4496, 4501, 4518, 4563, 4576, 4583, 4594, 4598, 4715, 4889, 4890)

GENERAL

4601. Pulling, Howard E. **Biophysics as a point of view in plant physiology.** Amer. Jour. Bot. **9:** 37–46. 1922.—The author calls attention to the importance of the concept of *systems* under which phenomena may be studied, and states that in the physical sciences "a system as a whole possesses interrelated properties that may be quantitatively investigated as such without regarding the molecular constitution of the system or the molecular kinetics of its processes, and a quantitative statement of the *laws* of a system as a rule is a helpful antecedent to all *theories* of the cause of its unique behavior." He emphasizes the importance of recognizing the living plant as such a material system, possessing characteristic and describable properties. Just as in physics a system is represented and defined by one or more *constants* whose magnitudes are determined by independent measurements on the system itself, so in the case of a living plant it should be possible through studying the reactions of the plant to its environment to discover constants which should represent and describe that plant as a specific system. The interrelation of the various structures and activities of the plant—long recognized and described as "correlations"—should also be definitely statable by means of constants. The difficulty of making observations on living plants, of sufficient accuracy as to be mathematically significant, makes the derivation of such constants difficult, but their determination should be a goal of plant physiology.—*E. W. Sinnott.*

PROTOPLASM, MOTILITY

4602. Mollendorff, Wilhelm Von. **Vitale Färbungen an tierischen Zellen.** [Vital staining of animal cells.] Ergebn. Physiol. **18:** 141–306. 1920.—This paper contains material of interest to the botanist and a very complete review of the literature (a bibliography of about 450 numbers is given).—*Orton L. Clark.*

4603. Seifriz, William. **A method for inducing protoplasmic streaming.** New Phytol. **21:** 107–112. 1922.—Certain substances stimulate the cells of the leaf of *Elodea* to very active streaming which is frequently of abnormal type. For the best results both strength of the solution used and time of exposure must be taken into consideration. Methyl alcohol (5 per cent solution for 18–24 hours), saponin (2 per cent for the same length of time), senegin (1 per cent), strontium chloride (2 per cent), barium chloride (1 per cent), and copper give good streaming. The best stimulant is copper in the form of "oligodynamic water," which may be prepared by leaving 1 or 2 pennies in 50 cc. of water for 2 days.—Various types of abnormal streaming are described, with a brief discussion of 3 of the possible partial explanations of stimulation by such diverse substances as those mentioned. These are: (1) a reduction in viscosity, (2) a decrease in surface tension, and (3) an alteration in electrical charge.—*I. F. Lewis.*

DIFFUSION, PHYSICO-CHEMICAL RELATIONS, PERMEABILITY

4604. Brooks, S. C. **The conductance of unicellular organisms.** Proc. Soc. Exp. Biol. and Med. **19:** 284–286. 1922.—The electrical conductance of bacteria, (*B. coli* and *B. butyricus*), unicellular algae (*Chlorella* sp.), yeast (*Saccharomyces* sp.), and mammalian red blood cells was determined and the difference between the conductance of the suspending fluid and that of the suspension of cells expressed in per cent of the former. This "net conductance in per cent" is constant regardless of changes in the conductance of the suspending fluid (so long as this is not injurious), while net resistance in ohms is not constant, and therefore the former figure is to be preferred as a measure of the physiological state of the cell. These unicellular organisms when killed still have a high net conductance, for example, 90 per cent of the "live" value, whereas multicellular organisms such as *Laminaria* have a low "dead" resistance. The difference is probably correlated with the greater constancy of the environment of the inside cells of multicellular forms.—*M. M. Brooks.*

4605. Clark, G. L., and W. A. Mann. **A quantitative study of the adsorption in solution and at interfaces of sugars, dextrin, starch, gum arabic, and egg albumin, and the mechanism of their action as emulsifying agents.** Jour. Biol. Chem. **52:** 157–182. 1922.

4606. Congdon, Leon A., and Harry R. Ingersoll. **The influence of glucose on the dialysis of sucrose through a parchment membrane. The possibility of the separation of glucose from sucrose by dialysis.** Jour. Amer. Chem. Soc. **43**: 2588–2597. 1921.

4607. Gortner, Ross Aiken, and W. F. Hoffman. **Evidences of a structure in gelatin gels.** Proc. Soc. Exp. Biol. and Med. **19**: 252–253. 1922.—[See following entry.]

4608. Gortner, Ross Aiken, and W. F. Hoffman. **Evidence of a structure in gelatin gels.** Proc. Soc. Exp. Biol. and Med. **19**: 257–264. 1922.—Gelatin was dried and then allowed to reimbibe water. Curves show that the difference in the amount of water imbibed depended upon the concentration of the gelatin used. The data seem to indicate that gelatin gels have a structure which is more or less fixed at the time gelation takes place. [See also preceding entry.]—*M. M. Brooks.*

4609. Green, R. G., and W. P. Larson. **Conductivity of bacterial cells.** Jour. Infect. Diseases **30**: 550–558. 1922.—As a result of studies on the electrical conductivity of cells as a method of measuring permeability of cell membranes, using cultures of *B. coli* and *Staphylococcus albus*, the authors conclude that: "Dead bacterial cells offer resistance to an electric current almost if not equal in amount to that exhibited by live bacterial cells. Bacterial cells growing in ordinary mediums store up diffusible salts within their bodies to a greater concentration than is found in their habitat. On the death of bacterial cells by heat or liquor formaldehydi there is an exchange of salts between the cells and the surrounding medium. In our series of experiments the drop in resistance on cell death could be shown to be due in greatest part to an exosmosis of salts into the surrounding solution. On the death of bacteria there is a definite decrease in the size of the cell. From our findings it appears that conductivity measurements do not measure a change in permeability of bacterial membranes, but that permeability is only indicated by the exosmosis of salts from the cells killed by heat and by liquor formaldehydi."—*Selman A. Waksman.*

4610. McGuire, Grace and K. G. Falk. **Banana gel.** Jour. Gen. Physiol. **4**: 437–445. 1922.—It was found that the pH of the banana extracts and the type of salts added were important factors in the formation of banana gels. Gels were obtained with extracts more alkaline than pH 7.0 with addition of very small quantities of Ca, Sr, and Ba salts, the gel formation with these decreasing in the indicated order. In solutions more acid than pH 6.0, no gels were obtained using the same salts. The addition of Mg, Li, and Na salts did not cause gel formation in either acid or alkaline solutions of banana extracts. The gel-forming properties of banana extracts were destroyed on boiling.—*O. L. Inman.*

4611. Priestley, J. H. **Further observations upon the mechanism of root pressure.** New Phytol. **21**: 41–47. 1922.—In answer to Blackman's criticisms [Bot. Absts. 11, Entry 710], further comment is made on osmosis and water absorption, on the supply of solutes, and on the structure of the endodermis.—*I. F. Lewis.*

4612. Priestley, J. H. **Physiological studies in plant anatomy. I. Introduction.** New Phytol. **21**: 58–61. 1922.—A series of 6 studies is announced bearing on the general problem of the source and movement of organic solutes in the plant, with particular reference to the food supply of meristematic tissues, and the mode of action of the endodermis.—*I. F. Lewis.*

4613. Priestley, J. H., and Edith E. North. **Physiological studies in plant anatomy. III. The structure of the endodermis in relation to its function.** New Phytol. **21**: 113–139. *Fig. 1–5.* 1922.—Employing a new method involving cylindrical strips of endodermis from *Potamogeton perfoliatus*, the microchemistry and structure of the endodermis is investigated in relation to the author's theory of its function.—The 4 stages in endodermal development are first defined, omitting the embryonal stage which, with the apical meristem, is to be treated in a later paper. The primary stage is characterized by the presence of the Casparian strip, a band stretching around both radial and transverse endodermal walls. It consists of impregnating substances of various kinds, including derivatives of fatty acids and substances giving the reactions characteristic of lignified membranes. These are embedded in a basal wall substance which is acid and alkali resistant, contains nitrogen and sulphur, and is probably allied to the substance occurring in the cell membranes of the apical meristems of many roots. The primary endodermis will permit the passage of water and solutes through the protoplasts, but passage through the cell membranes is greatly impeded by the Casparian strip.—The secondary endodermis possesses a suberin lamella, which always lines the inner tangential wall and is usually deposited all over the inner surface of the cell. This lamella is impregnated by substances different in staining reactions from those of the Casparian strip but similar to the derivatives of suberogenic acids found in normal periderm. In the suberin lamella is another basal substance of unknown composition which is assumed to be a more resistant cellulose derivative.—The suberin lamella renders the secondary endodermis relatively impermeable to water and solutes, except when passage cells are present.—The conclusions reached are in harmony with views previously expressed as to the rôle of the endodermis in the development of exudation pressures.—There is a brief discussion of the application of the conclusions to the physiological relation of stelar strands to ground tissues in the Filicineae.—A full citation of previous work is given.—*I. F. Lewis.*

WATER RELATIONS

4614. DACY, G. H. **How much water for the crops?** Sci. Amer. 125: 224. *3 fig.* 1921.—There is described the development of an automatic balance for weighing the water transpired by crop plants, as used by the United States Department of Agriculture.—*Chas. H. Otis.*

MINERAL NUTRIENTS

4615. ARNDT, CHARLES HOMER. **The growth of field corn as affected by iron and aluminum salts.** Amer. Jour. Bot. 9: 47–71. *1 pl., 6 fig.* 1922.—Yellow dent field corn was grown in 2 nutrient solutions, "A" and "H," differing markedly in chemical composition and in concentration, to determine the effect of the solution upon the amount and form of iron necessary for optimum growth and upon the toxicity of H_2SO_4, HNO_3, and HCl and their iron and aluminum salts. The availability of iron in ferric phosphate was found to be controlled by the composition of the nutrient solution, 5 times as great a concentration being necessary in "A" as in "H" to secure optimum growth. The 3 acids used, when in low concentration, were about equally toxic in both solutions but in higher concentrations sulphuric acid and its aluminum and iron salts were considerably less toxic than the other acids and their salts. With both solutions, an initial H-ion concentration less than pH 3.7 had little effect on rate of growth. Plant growth generally tended to shift the reaction toward neutrality, most readily when acidity was due largely to H_2SO_4 and least readily when due to HCl. In certain cases plant growth increased the acidity of the solutions. In general, the amount to which the reaction is shifted by plant growth was inverse to the toxicity of the salt or acid used. The toxicity of ferrous sulphate showed no relation to the initial H-ion concentration. In solution "A" the toxicity of the aluminum salts was evidently due to the acidity produced, but in "H" toxicity was due to the aluminum ion. Sand cultures greatly increased the concentration of acid necessary to produce the effects noted in solution cultures. Both H-ion concentration and soil composition are therefore of importance in producing toxic effects.—*E. W. Sinnott.*

4616. MILLER, HARRY G. **Further studies on relation of sulphates to plant growth and composition.** Jour. Agric. Res. 22: 101–110. 1921.—Sodium sulphate and calcium sulphate had a beneficial effect on the development of nodules and on assimilation of nitrogen in red clover (*Trifolium*) when grown on previously sterilized soil. In a similar series of cultures in which *Bacillus radicicola* was added at the time of seeding there was no increase in nodule development.—On a soil of high sulphur content, the nitrogen content of clover of the 3rd and 4th crops was greater than that of clover grown as a control, although sulphate sulphur was found in all plants. Low nitrogen content cannot be explained, therefore, as a cessation of protein synthesis due to absence of sulphates.—Sulphates apparently cause greater assimilation of nitrogen through stimulation of nodule development but the amount of sulphur taken up by the plant is limited by the total nitrogen absorbed.—In rape (*Brassica napus*) there does not appear to be any direct relation between nitrogen and sulphur assimilation.—*D. Reddick.*

4617. Montanari, Carlo. **Lo zinco quale costituente normale delle terre coltivate e dei vegetali. [Zinc as a normal constituent of soils and plants.]** Staz. Sper. Agrarie Ital. **54:** 278–283. 1921.—By following the Délezenne method and some modifications thereof, the author was able to demonstrate the presence of 7–11 mg. of zinc per kgm. of alluvial soils and of 25.3 mg. in 100 gm. of dry *Spinacia* leaves. The chlorophyll extracted from fresh leaves of this plant by the Willstätter method failed to show the presence of zinc.—*A. Bonazzi.*

4618. Redfern, Gladys M. **On the absorption of ions by the roots of living plants. 1. The absorption of the ions of calcium chloride by pea and maize.** Ann. Botany **36:** 167–174. 1922.—Further evidence is given in support of the unequal absorption of the ions of a salt by the roots of a growing plant. In this case the percentage absorption of calcium was considerably in excess of that of chloride, when peas and maize were grown in calcium chloride. The difference in the rate of absorption was greatly reduced with lower concentrations; in very dilute solutions such as those which normally affect the plant there was almost no difference. Potassium and magnesium diffuse out from the roots and replace the excess of calcium absorbed. This explains why the H-ion concentration of the solution remains approximately unchanged.—*W. P. Thompson.*

4619. Stahl, Ernst. **Zur Physiologie und Biologie der Exkrete. [The physiology and biology of excretions.]** Flora **113:** 1–132. *Pl. 1–3.* 1919.—Stahl has undertaken a comparative study of the problems of plant excretions. This paper is the last scientific contribution in this field made by Stahl. Adequate abstracting is difficult, therefore only the different division headings with some of the most notable conclusions will be given. I. Introduction and the disappearance of nitrates in darkness. With the disappearance of nitrates in many plants there is an increase in the calcium oxalate content. II. The inactivation of calcium through combination with oxalic acids. The supplying of organic and inorganic calcium compounds to *Dianthus* and other plants causes them to form oxalic acid continuously. III. The inactivation of calcium through combination with other acids. IV. The physiological importance of guttation. The importance of the watery excretions of the plant lies in the field of salt economy. Plants with a large amount of excretion show a rapid growth and are autotrophic, whereas plants lacking guttation are slow-growing and very often are mycotrophic. A function of the hydathodes may also be to rid the plant of certain substances which may cause injury if allowed to accumulate. V. The relation of stomatal condition and various processes (respiration, nastic movement, excretion). The state of stomatal opening has a direct relation to nyctinastic, hydronastic, and chemonastic movements. VI. On the amount, composition, and importance of the ash substances of the excreted liquids of the different excretory organs. The substances remaining after evaporating the guttation liquid to dryness always contain ash substances, often with large amounts of organic substances. Extra floral nectaries also excrete ash substances as well as sugars. VII. The relation between ash content and excretory ability with special consideration of nutrition. In many cases there seems to be a certain relation between the ash content of a plant and the excretory ability. Those plants which secrete freely have a low ash content while those lacking the power of secretion (*Chenopodium album*) have a high ash content. VIII. On the occurrence, form, and distribution of calcium oxalate crystals and their relation to excretion. There seems to be a relation between guttation and crystal formation. Plants with large amount of excretion show little crystal formation, whereas those with a large amount of crystal formation show little or no guttation. IX. The excretions in their relation to thorns and spines as well as to calcification and silification. There seems to be a relation between secretory activity and the type of protection against animal feeding. Thorns and spines are found mainly on plants with limited or no excretory activity. Plants (*Equisetum*, grasses) with an active guttation show a protective covering of silicates. X. Variation movements and excretions. Stahl finds that many leaves cease their excretory activity when they change position. This cessation of guttation is probably bound up with factors influencing transpiration. XI. Relation of floral characters to excretory ability. There is a certain relation between guttation and pollen production. The Rosaceae with prolific pollen production are characterized by a heavy guttation, while the Papilionaceae with a limited pollen production are slow-growing and show little or no guttation. Stahl, on the basis of these studies, counts himself with those who hold that most wind-pollinated plants were evolved from the insect pollinated forms.—*Orton L. Clark.*

4620. Trelease, Sam F., and B. E. Livingston. **Continuous renewal of nutrient solution for plants in water-cultures.** Science **55**: 483–486. 1922.—A diagram and descriptions are given of a system of containers and tubes that delivers fresh nutrient solution to a water-culture. This method insures a constant chemical environment for the roots through the culture period. The plan as given is stated to work well and is obviously capable of adaptation to suit the individual needs of different experimenters.—*C. J. Lyon.*

4621. Wester, D. H. **Over het mangaangehalde von nederlandische Zaden. [The manganese contents of Dutch seeds.]** Pharm. Weekblad **58**: 1613–1619. 1921.—Seeds from 48 species of plants were examined and all were found to contain manganese. The amount in most cases was small, from 2 to 6 mgm. in 100 gm. of the dry seed, or from 50 to 100 mgm. in 100 gm. of the ash. A considerable amount, 1700 mgm. in 100 gm. of ash, was found in *Lupinus luteus* and more than the usual quantity in *Ornithopus sativus* (225 mgm.), *Linum usitatissimum* (249 mgm.), *Festuca pratensis* (364 mgm.), and *F. duriuscula* (269 mgm.).—While in general the manganese content of the various species of the same genus does not vary greatly, the percentage is liable to vary considerably within the same family. It is notable, however, that 100 gm. of the ash of *Beta vulgaris* var. *crassa* contained 104.5 mgm. manganese, while that of *B. vulgaris* var. *rápa* contained only 27.6 mgm.—*H. Engelhardt.*

PHOTOSYNTHESIS

4622. Dangeard, P. A. **Recherches sur l'assimilation chlorophyllienne, 1re partie. [Experiments on photosynthesis.]** Botaniste **14**: 1–98. *Fig. 1.* 1921.—Preliminary experiments on culture methods for several species of *Chlorella, Scenedesmus,* and *Stichococcus* are reported. These species are described in detail.—Several liquid nutrient media were tried as well as nutrient gelatin, nutrient agar, and slices of carrot. Pure culture methods were used. Cultures were grown in darkness and in light, generally diffuse sunlight.—A new species, *Endomonadina Chlorellae,* which is parasitic on *Chlorella,* is described.—It was found that agar could not be used by *Chlorella vulgaris* as a source of carbon, although it seemed that gelatin could be to a slight extent.—The presence of *Penicillium* sp. in a culture of *Chlorella vulgaris* was found to cause inhibition of growth.—*Scenedesmus acutus* was found to be capable of growing indefinitely in the dark on proper nutrient media. Certain changes in the organism induced by prolonged exposure to darkness are described.—*Scenedesmus acutus* and *Chlorella vulgaris* were found to withstand a temperature of 44°C. for more than a quarter of an hour without injury.—*E. L. Proebsting.*

4623. Dixon, H. H., and N. G. Ball. **Photosynthesis and the electric theory (II).** Notes Bot. School Trinity Coll. Dublin **3**: 199–205. 1922.—Further experiments confirm the theory that light energy is rendered available for photosynthesis by the displacement of electrons in the chlorophyll molecule, but not by the ejection of these electrons from the molecule. It is suggested that carbon dioxide may unite with chlorophyll *a*, producing chlorophyll *b* and formaldehyde, as follows:

$C_{55}H_{72}O_5N_4Mg + CO_2 \rightarrow C_{55}H_{70}O_6N_4Mg + HCHO$ and that water may then unite with chlorophyll *b*, reproducing chlorophyll *a* and liberating oxygen, as follows:

$C_{55}H_{70}O_6N_4Mg + H_2O \rightarrow C_{55}H_{72}O_5N_4Mg + O_2$. It is assumed that light is necessary for both of these reactions.—*G. B. Rigg.*

4624. Wilson, J. W. **The relation of photosynthesis to the production of vitamine A in plants.** Jour. Biol. Chem. **51**: 455–459. 1922.—The experimental work reported indicates that plants produce vitamin A, but that photosynthesis is not necessary for the production of this vitamin.—*G. B. Rigg.*

METABOLISM (GENERAL)

4625. Anderson, R. J., and W. L. Kulp. **Analysis and composition of corn pollen.** Jour. Biol. Chem. **50**: 433–453. 1922.—Corn pollen contains 2 phosphatides, one crystalline and the other an amorphous substance containing sulphur. It also contains relatively large quantities of free inosite, l-proline, and chlorine. Starch, reducing sugar, and sucrose were found in all varieties examined, and pentosans were found in 1.—*G. B. Rigg.*

4626. Atkins, W. R. G. **The hydrogen ion concentration of plant cells.** Notes Bot. School Trinity Coll. Dublin **3**: 178–190. 1922.—Plant cells are rarely alkaline and pH 8.0 is not surpassed in them. On the acid side pH 1.4 has been observed. By a microchemical method it is possible to determine the pH values of the cells and tissues. Xylem is more acid than pith or medullary rays, and the midrib of a leaf more acid than the parenchyma. When grown in neutral or alkaline solution the root is usually less acid than other portions of the plant. The transpiration stream in *Colocasia antiquorum* is almost neutral, as is also the liquid in the leaf-base troughs of *Dipsacus laciniatus*. Pitchers of *Sarracenia* sp. may be as acid as pH 5.0 and the glandular section of *Drosera rotundifolia* even more acid.—The pH of a tissue is usually slightly less than, but near, the optimum for the activity of the characteristic enzyme at ordinary air temperature. Di-ethyl red is a useful reagent for microchemical work on H-ion concentration.—*G. B. Rigg.*

4627. Bargellini, G., e C. Moncada. **Sopra alcune sostanze contenute nei licheni.** [**Upon some subtances contained in the lichens.**] Gazz. Chim. Ital. **51**: 173–180. 1921.—The acetone-soluble, ether-insoluble acid (stereocaulonic acid) contained in *Stereocaulon vesuvianum* is found to be identical with the acid (stictic acid) obtained from *Sticta pulmonaria.*—*A. Bonazzi.*

4628. Barker, B. T. P. **The pectic substances of fruit.** Jour. Bath and West and Southern Counties Soc. **15**: 114–115. 1921.—This is a progress report.—*J. I. Lauritzen.*

4629. Buchner, Paul. **Über das "tierische" Leuchten.** [**"Animal" phosphorescence.**] Naturwissenschaften **10**: 1–7, 30–34. 1922.—The writer takes up several cases of the phosphorescence of animals which, on the basis of his work and that of Pierantoni, are found to be due to phosphorescent bacteria symbiotically associated with these forms. Often the bacteria may be present in the egg and young embryo. He describes in detail the symbiosis of *Pyrosomen* and phosphorescent bacteria as well as that of the "ink-fish," *Histioteuthis*. Even with *Lampryris*, Pierantoni has found phosphorescent bacteria in the light-producing organs. For fishes Buchner points out a similar symbiotic relationship between luminous organs and phosphorescent bacteria. Coelenterates also have light zones due to bacteria. For the luminescence of *Noctiluca* there has not been found as yet an association of phosphorescent bacteria. As no special light-producing organ is present it is at present very difficult to determine the cause of luminescence in this remarkable organism. The physiology of luminescence is briefly discussed and there is pointed out the favorable environment for phosphorescent bacteria furnished by salt water conditions. With fresh water fish luminescence, due either to symbiosis or external covering of the fish with the bacteria, is lacking. The symbiotic relationship seems to explain many so-called cases of animal luminescence.—*Orton L. Clark.*

4630. Cake, W. E., and H. H. Bartlett. **The carbohydrate content of the seed of Asparagus officinalis L.** Jour. Biol. Chem. **51**: 93–102. 1922.—After the removal of the large oil content of asparagus seed the hemicellulose may be extracted by dilute alkali and precipitated either by acidifying or by adding alcohol. A quantitative determination has shown that the reserve carbohydrate of these seeds (var. "Palmetto" was used) is in the form of hemicelluloses, which give, on hydrolysis, mannose, glucose, fructose, and galactose.—*G. B. Rigg.*

4631. Clark, E. P. **Note on the preparation of mannose.** Jour. Biol. Chem. **51**: 1–2. 1922.—A simple method is described by which a good yield of mannose is obtained from ivory-nut shavings.—*G. B. Rigg.*

4632. Condelli, S. **L'enantiomorfismo della materia, la teoria Pasteuriana e la vita. [Stereo-isomerism (enantiomorphism) of matter, Pasteur's theory and life.]** Gazz. Chim. Ital. 51: 309–324. 1921.—The author gives a general review of previous investigations upon the subject of the utilization of optical isomers by various organisms followed by detailed experiments. Dextro and laevo malic, tartaric, aspartic, mandelic, and glyceric acids, asparagin, tyrosine, and leucine were used and *B. Fitzianus*, *B. aethaceticus*, *B. butyricus*, *B. pyocyaneous*, *B. acidi lactici*, *B. aethaceticosuccinicus*, *B. coli communis*, and the bacillus of chicken cholera were studied. *Aspergillus niger*, *A. macrosporus*, *A. flavescens*, *Penicillium glaucum*, *P. brevicaule*, *Botrytis cinerea*, and *Mucor mucedo* were also studied. The optimum experimental conditions are found to vary for every organism. The 2 forms of malic acid have been attacked by the organism of chicken cholera; at room temperature and in presence of sugar neither of the 2 enantiomorphs of tartaric acid has been utilized, a fact that led the author to assume that the acid only is of value in maintaining the acid reaction of the medium; laevo glyceric acid has been attacked by various bacteria, especially *B. Fitzianus*; sweet, dextrorotatory asparagin has been preferred to the insipid laevo rotatory form by the bacillus of chicken cholera, while no preference for either form of tyrosine has been exhibited by fungi; with regard to leucine results were obtained that confirmed the researches of Schulze and Bossard. The author here expresses the theory that "building" organisms have a predilection for the dextro, whereas the parasitic forms have a predilection for the laevo rotatory form. The fact that the parasites accustomed to the use of the form not utilized by the "building' types can, under special conditions, be made to utilize these, shows that the habits acquired through centuries of parasitism can be broken down.—*A. Bonazzi.*

4633. Dixon, H. H., and N. G. Ball. **Transport of organic substances in plants.** Nature **109**: 236–237. 1922.—It is commonly assumed that the bast serves the purpose of downward transportation, but it appears incapable of accomplishing this with sufficient rapidity. Calculation is made of the amount of organic material stored in a potato; the bast area calls for a velocity of transport of about 40 cm. per hour. The results of Brown and Morris on depletion of leaves show a rate of about 50 cm. per hour (supposing a 1 per cent solution). Seward has pointed out that in several species of tree-like Lepiodendra there is no such tissue. Observations by Hales, Dixon and Joly, Atkins, and Ricca indicate that the wood is the tissue in which such transport occurs. Striking evidence was obtained in September from a freshly dug plant of *Solanum tuberosum* by cutting a leaf while immersed in eosin. In an hour veins of all leaves, stems, and roots were colored. A similar result was obtained with *Chrysanthemum macrophyllum.* The relation of such movement to the upward movement of water calls for investigation. The tension developed by changes in the temperature of water is apparently important.—*O. A. Stevens.*

4634. Dominicis, A. De e G. Villari. **Sulla natura dei processi che si verificano durante le cottura dei legumi e sui loro rapporti col potere nutritivo. [Changes resulting from cooking legumes and the relation of these changes to nutrition.]** Staz. Sper. Agrarie Ital. **54**: 446–457. 1921.—The authors conclude that cooking with water alters only the physical state of the legume proteins by increasing the quantity of water in the colloid particles; whereas adding alkali and acid, as often practised, not only changes the composition of the proteins, but actually brings about a loss of nitrogen in the legume through the evolution of ammonia.—*A. Bonazzi.*

4635. Eddy, W. H., H. L. Heft, and H. C. Stevenson. **A reply to Fulmer, Nelson and Sherwood concerning Medium F.** Jour. Biol. Chem. **51**: 83–85. 1922.—While it is quite possible that the yeast stimulatory substance is something other than vitamin B, evidence to completely exclude vitamin B from the factors involved in yeast growth seems at present definitely lacking.—*G. B. Rigg.*

4636. Eddy, W. H., E. Shelow, and R. A. Pease. **The effect of cooking upon the antiscorbutic vitamin in cabbage.** Proc. Soc. Exp. Biol. and Med. **19**: 155–160. 1922.—When cabbage was cooked by either the pressure cooker or the open kettle method, vitamin *C* was destroyed, as shown by experiments on guinea pigs. The animals were not protected against scurvy by cooked cabbage.—*M. M. Brooks.*

4637. Eijkman, C., C. J. C. Van Hoogenhuijze, and T. J. G. Derks. **The vitamine content of microorganisms in relation to the composition of the culture medium.** Jour. Biol. Chem. **50**: 311–314. 1922.—The following conclusions are suggested with some reserve, arising from insufficient knowledge concerning the antineurotic factor. The yeast cell can not, strictly speaking, synthesize the antineurotic factor, but can only regenerate it after it has been denatured by heating. *Bacillus coli communis*, even when cultivated in a medium containing the antineurotic factor, remains devoid of this vitamin. The antineurotic factor and the growth-promoting substance, water-soluble B, are not identical.—*G. B. Rigg.*

4638. Freedman, Louis, and Casimur Funk. **The vitamine requirements of certain yeasts and bacteria.** Proc. Soc. Exp. Biol. and Med. **19**: 198–201. 1922.—These results indicate that the substance influencing growth of the lower organisms is distinct but closely related to vitamin B. Beef-heart infusions and autolyzed yeast solutions were subjected to fractional adsorption by means of Fuller's earth and norit. The activated adsorbents were extracted with baryta and glacial acetic acid respectively, and produced stimulation of the growth of yeast cells and streptococci. Those extracts apparently belong to the class of vitamins of the water-soluble B type. The action of protein hydrolysates taken from 12 animal and 10 vegetable proteins suggests that growth-stimulating action is due to a vitamin-like substance present as an impurity.—*M. M. Brooks.*

4639. Fulmer, E. I., and V. E. Nelson. **Water-soluble B and bios in yeast growth.** Jour. Biol. Chem. **51**: 77–81. 1922.—The data given do not seem to accord fully with the idea that water-soluble B and bios are identical..—*G. B. Rigg.*

4640. Hammer, B. W. **Sources of the flavor in butter.** Iowa Agric. Exp. Sta. Res. Bull. 67. *139–144.* 1921.—The presence in starters of *Streptococcus citrovorus* or *S. paracitrovorus*, together with the ability of these organisms to produce a high volatile acid in milk, suggests their importance as a source of flavor in butter. One or the other of these organisms was inoculated into pasteurized sweet cream and, after ripening, the cream churned. In most cases a small amount of either sterile citric acid solution or sterile lactic acid solution was added to the cream at the time of adding the organisms, since citric acid increases the volatile acid production of both organisms while lactic acid increases the volatile acid production of *S. citrovorus*. The butter was scored by a butter judge unfamiliar with the method of manufacture. The results showed that the organisms alone increased the flavor scores over those of the checks and that the addition of acids along with the organisms resulted in still further increases. In general the increase in the score was in proportion to the amount of acid added. Bacterial counts made on some of the fermented cream showed that large numbers of organisms were present in the cream to which *S. citrovorus* or *S. paracitrovorus* was added.—*B. W. Hammer.*

4641. Hart, E. B., H. Steenbock, and S. Lepkovsky. **The antiscorbutic vitamine. I. A study of its solubility from desiccated orange juice.** Jour. Biol. Chem. **52**: 241–250. 1922.—The behavior of this vitamin toward organic solvents and water indicates that it is not of fat or lipin character.—*G. B. Rigg.*

4642. Hopkins, E. F. **Note on the hydrogen-ion concentration of potato dextrose agar and a titration curve of this medium with lactic acid.** Phytopathology 11: 491–494. *Fig. 1.* 1921.—A culture medium was made up of pared potatoes, 200 gm.; dextrose, 10 gm.; agar, 20 gm.; and tap water, 1000 cc. The potatoes were cut into small cubes and cooked in a double boiler for 1 hour. The broth was then strained off and the dextrose and agar added. It was then made up to volume with tap water and cooked in a steamer for 1 hour, filtered through absorbent cotton, tubed, and sterilized. The H-ion concentration was then found, by the colorimetric method, to be 6.9, or approximately neutral. Tests of similar media made by different workers from different lots of potatoes showed a rather constant H-ion concentration. When titrated with lactic acid it was found that the medium had a considerable buffer value and gave a constant titration curve.—*B. B. Higgins.*

4643. Johns, C. O., L. H. Chemoff, and A. Viehoever. **A saponin from Agave lechuguilla Torrey.** Jour. Biol. Chem. 52: 335–347. 1922.—A saponin not before described was isolated and the formula $C_{27}H_{44}O_{12}$ is suggested. It is toxic to fish. Glucose and galactose are among the products of its hydrolysis.—*G. B. Rigg.*

4644. Klason, P. **Beiträge zur Kenntnis der Konstitution des Fichtenholz-Lignins. [The constitution of pine-wood lignin.]** Ber. Deutsch. Chem. Ges. 55: 448–455. 1922.

4645. Klason, P. **Über das Lignin wie es in Holz selbst vorkommt.** [Lignin as it occurs in wood.] Ber. Deutsch. Chem. Ges. 55: 455–456. 1922.

4646. LaMer, V. K., H. L. Campbell, and H. C. Sherman. **The effect of temperature and the concentration of hydrogen ions upon the rate of destruction of antiscorbutic vitamin (vitamin C).** Jour. Amer. Chem. Soc. 44: 172–181. 1922.—The authors find that for short periods of time deleterious influence of heating depends more upon the length of time (1 hour, or less) than it does on the intensity of the process, while for longer periods (4 hours or more), the effect of the intensity assumes greater prominence in comparison to the time than it does in the shorter period.—The vitamin is more stable in acid than in neutral or alkaline solution. The authors' data indicate that neutralization of less than ½ of the natural acidity produces a significant change in the velocity of destruction; that is, 58 per cent of the vitamin is destroyed rather than 50 per cent. "When the tomato juice is first made distinctly alkaline to phenolphthalein with CO_2-free NaOH, and after heating 1 hour at 100°C. is reacidified with an amount of HCl equivalent to the alkali originally added, we find that the destruction is increased 61 per cent." But if reacidification is omitted, there is a greater effect, due possibly to the destructive effect of hydroxyl ions.—The possibility of oxidation and reduction is discussed.—*J. M. Brannon.*

4647. Litterscheid, F. M. **Vereinfachter Nachweis des technischen Invertzuckers in Honig usw. mit Resorcin oder β-Naphthol. [Simplified demonstration of technical invert-sugar in honey, etc., by means of resorcin or β-naphthol.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 88–90. 1921.

4648. Marel, J. P. van der. **Over de oorzaken van het hard koken van erwten. [The causes of hardening on the boiling of peas.]** Pharm. Weekblad 59: 82–91. 1922.—The author ascribes the hardening attending the boiling of peas to a resistance of the middle lamella of the cell walls. The presence of neutral or acid salts retards the softening, while alkaline salts and hydroxides accelerate it. Strongly dried peas, which swell with difficulty, are not so easily softened by boiling as fresh peas. The varying rapid disintegration of the middle lamella of the cell wall is due to the amount of pectins present, which, by the respective salts, are either dissolved or converted into insoluble compounds.—*H. Engelhardt.*

4649. Osborne, Thomas B., and Lafayette B. Mendel. **Nutritive factors in plant tissues. V. Further observations on the occurrence of vitamine-B.** Proc. Soc. Exp. Biol.

and Med. 19: 291–292. 1922.—Experiments made with rats indicate that asparagus, celery, dandelion, lettuce, and parsley all contain noteworthy amounts of vitamin-B.—*M. M. Brooks.*

4650. Osborne, Thomas B., and Lafayette B. Mendel. **Vitamin A in oranges.** Proc. Soc. Exp. Biol. and Med. 19: 187–188. 1922.—Data are available indicating that vitamins A, B, and C are present in orange juice, and that they may be conserved without deterioration by suitable processes of desiccation.—*M. M. Brooks.*

4651. Reif, G. **Die Bestimmung des Acetons in Trinkbranntwein mit Hydroxylamin hydrochlorid.** [The determination of acetone in brandy by means of hydroxylamin hydrochloride.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 80–87. 1921.

4652. Schön, Richard. **Ueber den Gerbstoff der Eichenrinde.** [Preparation of oak bark tannin.] *33 p.* Giessen, 1920.—A method of preparing oak bark tannin in a very pure form is given. This product is free from nitrogen and magnesium. It gives a very slightly soluble potassium salt with an alcoholic solution of potassium acetate. It is very probable that the halogen compounds originate by substitution. This unstable oak tannin was brought to a stable form through the methyl derivate. The tannin is optically active. The rotatory power of its methyl derivative in equal parts of acetone and alcohol is $[\alpha]_{D_{15}} = -43.3°$.—*Grace E. Howard.*

4653. Sherman, H. C., V. K. LaMer, and H. L. Campbell. **The quantitative determination of the antiscorbutic vitamin (vitamin C).** Jour. Amer. Chem. Soc. 44: 165–172. 1922. The authors have developed a basal ration for guinea pigs which is adequate in all respects but vitamin C. The relative amounts of antiscorbutic vitamin are measured by determining how much of the food under test is required to prevent scurvy, or by a quantitative rating of the severity of the scurvy produced when less than this "minimum protective dose" is fed.—*J. M. Brannon.*

4654. Sievers, A. F., and J. D. McIntyre. **Changes in the composition of paprikas during the growing period.** Jour. Amer. Chem. Soc. 43: 2101–2104. 1921.—*Capsicum annuum* L. was used in this investigation. The method of sampling was to collect 6 different sizes at several intervals during the growing season. The small specimens were under 25 mm. in length, while the largest specimens were 100 mm. or more in length. The ground shells, placenta, and seed were used in the analysis.—The ash and ether extract showed definite changes through the several stages. The ash decreased from 8.13 to 1.78 per cent. The ash was practically all soluble. The total ether extract increased from 2.14 to 9.18 per cent, which is a good indication of the development of the pungent principle. The volatile ether extract, which represents the volatile oil, increased from 0.19 to 0.85 per cent. The alcohol extract showed no definite change and the same may be said of the sugars. The percentage of both total and reducing sugars in the small immature paprikas was exceedingly high as compared with the amount present in the ripe fruit.—*J. M. Brannon.*

4655. Steenbock, H., and M. T. Sell. **Fat-soluble vitamine. X. Further observations on the occurrence of the fat-soluble vitamine with yellow plant pigments.** Jour. Biol. Chem. 51: 63–76. 1922.—Data are presented which further emphasize the fact that the fat-soluble vitamin often occurs most prominently where there are found the largest amounts of certain yellow pigments.—*G. B. Rigg.*

4656. Weatherby, C. A. **Some amateur observations on color-forms.** Torreya 22: 37–42. 1922.—Five types of color-variation may be distinguished: (1) Paler variants of the same color, (2) albinos, (3) reversed albinos, in which normally white or greenish flowers develop color, (4) blue or purple to pink, (5) crimson or scarlet to yellow, or vice versa.—Color-forms do not seem to be determined by external conditions, but are the result of chemical changes. Four types of reaction have been determined as the result of testing pigment solutions with acids and alkalis: (1) Solutions from the petals of white flowers give negative results, (2) solutions from blue, purple, or red flowers turn pink or red with acids, or retain these original colors; with ammonia they turn greenish-blue, changing to yellow, or to an almost colorless condition—anthocyan type, (3) solutions of certain yellow flowers are unchanged with acid, and slightly deepened in color with ammonia—plastid type, (4) certain other yellow flowers are unchanged with acid, but turn a brilliant deep red with ammonia.—*J. C. Nelson.*

4657. Willaman, J. J. **The preparation of inulin, with special reference to artichoke tubers as a source.** Jour. Biol. Chem. **51**: 275–283. 1922.—A method is given for the preparation of fructose from artichoke tubers. The evidence in this paper is interpreted as giving support to the hypothesis that inulin is a group of substances with large loosely-bound molecules, and not a single substance.—*G. B. Rigg.*

METABOLISM (NITROGEN RELATIONS)

4658. Dominicis, A. De, e F. Gangitano. **Sull' attività delle radici nei processi di assimilazione dell' azoto. [The function of roots in nitrogen assimilation.]** Staz. Sper. Agrarie Ital. **54**: 425–437. 1921.—This is a study of the difference in function of roots and tops in the assimilation of nitrogen as nitrate, ammonia, and amino nitrogen. Seed were germinated in sterile sand (digested previously in HCl); tops and roots were separated, each was immersed in the solution to be studied, then after 2–3 days, each was washed free of adhering solution, dried as rapidly as possible at room temperature and subsequently at 95–100°C., and analyzed. The results obtained when solutions of sodium nitrate 0.5 per cent were used with or without glucose (1 per cent) indicate that, whereas the roots absorbed considerable quantities of nitrogen, this was found mostly in the form of protein. The leaves did not accumulate appreciable quantities of nitrogen. In most cases, in fact, a loss appears to have taken place, especially when the seedlings used were those of *Faba*, *Zea*, *Cicer*, *Phaseolus*, and *Triticum*. When a solution of asparagin was used containing an amount of nitrogen equivalent to that of the nitrate solution the roots stored little if any nitrogen, while the leaves stored appreciable quantities of this element. The values obtained with water alone were taken as standards of comparison and controls were run each time. The results show that in the presence of nitrogen in the organic form roots appear completely inactive, whereas they are active in the presence of mineral nitrogen. The reverse is true of aereal portions. The roots and not the leaves, therefore, are to be considered as the organs for the assimilation of nitrogen, a process leading to the formation of amino acids and proteins. A list of the literature is appended.—*A. Bonazzi.*

4659. Friedman, W. G. **The nitrogen distribution of proteins extracted by 0.02 per cent sodium hydroxide solution from cottonseed meal, the soy bean, and the coconut.** Jour. Biol Chem. **51**: 17–20. 1922.

4660. Johns, C. O., and C. E. F. Gersdorff. **The proteins of the tomato seed, Solanum esculentum.** Jour. Biol. Chem. **51**: 439–452. 1922.—Five samples yielded an average of 36.91 per cent of protein. Two globulins were found. Tests failed to show albumin and glutenin.—*G. B. Rigg.*

4661. Jones, D. B., A. J. Finks, and C. E. F. Gersdorff. **A chemical study of the proteins of the adsuki bean, Phaseolus angularis.** Jour. Biol. Chem. **51**: 103–114. 1922.—This bean contains 21.13 per cent of protein. Two globulins differing markedly in their sulphur and nitrogen content were isolated. A small amount of an albumin was also found.—*G. B. Rigg.*

4662. Roberts, R. H. **Nitrogen reserve in apple trees.** Proc. Amer. Soc. Hort. Sci. **18**: 143–145. 1921 [1922].—A nitrogen reserve can be accumulated and utilized by apple trees. Some experiments with potted dwarf apple trees under controlled nutrient conditions were carried out. Strongly vegetative trees made an excellent growth when transferred to a nutrient medium low in nitrogen. Chemical analyses of 2-year wood showed a decrease of nitrogen content of such trees. Analyses also showed an accumulation of nitrogen in trees which were maintained in or transferred to a high nitrogen nutrient. Carbohydrate compounds decreased with an increase in nitrogen content and increased with a decrease in nitrogen content. Little or no blossom-bud formation occurred under conditions of either high or low nitrogen content, but abundant formation occurred with an intermediate nitrogen content when, likewise, the carbohydrate content was intermediate.—*A. Lee Schrader*.

4663. Swoboda, F. K. **Nitrogen nutrition of yeast.** Jour. Biol. Chem. **52**: 91–109. 1922. —Yeast cultures were grown with a constant concentration of vitamin ("bios") and with nitrogen from different sources. Asparagin is a good source of nitrogen for yeast, and the rate of growth is increased by the addition of ammonium sulphate. Continued acid hydrolysis decreases the value of edestin as a yeast nutrient, but mild hydrolysis improves it to a certain degree. Alkaline hydrolysis of edestin is more destructive than acid, but subsequent acid hydrolysis improves the edestin as a yeast nutrient. Various amino acids were tried under different conditions with varying results.—*G. B. Rigg*.

METABOLISM (ENZYMES, FERMENTATION)

4664. Bottazzi, Filippo. [Rev. of: (1) Siegfried, M. **Ueber partielle Eiweisshydrolyse. (Partial hydrolysis of albumen.)** *64 p.* Gebrüder Borntraeger: Berlin, 1916. (2) Hirsch, P **Die Einwirkung von Mikroorganismen auf die Eiweisskörper. (The action of microorganisms on protein substances.)** *ix + 225 p., 1 fig.* Gebrüder Borntraeger: Berlin, 1918. (3) Laroche, G., Ch. Richet, Jr., et Fr. Saint-Girons. **L'anaphylaxie alimentaire. (Alimentary anaphylaxis.)** *96 p.* J. B. Baillière & Fils: Paris, 1919.] Scientia **31**: 315–318. 1922.

4665. Funke, G. L. **Onderzoekingen over de vorming van diastase door Aspergillus niger van Tiegh. [The formation of diastase by Aspergillus niger.]** *77 p., 14 fig.* Martinus Nijhoff: 's-Gravenhage. 1922.—In the review of literature the author states that age of culture has always been disregarded in a study of enzyme formation on different substrata but he found it important. The medium (liquid) used throughout all the experiments was a solution of 0.5 per cent NH_4NO_3, 0.1 per cent K_2HPO_4, and 0.05 per cent $MgSO_4$. Sterilized flasks, inoculated with conidia, were kept in the dark at a constant temperature, 20–22°C. Observation began 2–3 days after inoculation, being made every day for the 1st week, the 2nd week every other day, the 3rd week each 3–4 days.—Duplicate cultures were invariably made. Of these, culture 1 was filtered on a dried (desiccator) and weighed filter; then mycelium and filter were again dried and weighed. The mycelium from culture 2 (the duplicate) was washed, after filtration, to remove diastase and powdered with infusorial earth, then extracted with water or with the culture liquid, which had been boiled to destroy any enzyme present. After 1 hour the mixture was filtered and the filtrate examined for diastase, also the culture liquid from flask 1. A potato-starch solution of 0.08 per cent concentration, prepared by Lintner's method, was used in the investigation of diastatic action. This starch solution was mixed with an equal amount of the culture medium. From time to time the amount of starch or erythrodextrine in the culture was examined with a weak solution of iodine in potassium iodide. When the medium remained yellowish starch was considered to be entirely inverted.—During these investigations it was found that the H-ion concentration of the culture liquid was brought by the fungus to the optimal concentration for diastase formation.—Conidia of the same age taken from different media produced different results when grown on the same culture media. For accurate results conidia should be taken from the same culture medium as that used in the experiments. The size of the surface of the culture has no influence after the 1st week of growth. Cultures with small surfaces yield less enzyme during the 1st week, but show little or no difference afterwards. Whether glucose, maltose, or starch is the carbon source, *Aspergillus niger* produces large quantities of diastase from the beginning of its development and in increasing measure until a certain maximum is reached. Then production stops; that maximum, however, remains during the maintenance of the culture. Neither kind nor concentration of the carbohydrates mentioned exerts any influence unless the concentration is greater than 1 per cent, when diastase formation may be disturbed, becoming again normal when the concentration is lowered. Diastase is excreted directly into the culture medium. It loses none of its strength even after a long period.—Saccharose has a detrimental influence on the activity of the diastase; when, however, saccharose and products of its inversion have disappeared, then the diastase again appears in active form.—No production of diastase was observed with 5 per cent glycerine as a source of carbon.—No lactase appears with *Aspergillus niger*, not even when the fungus is grown on lactose, so that very little if any development takes place.—*Peter J. Klaphaak.*

4666. Grove, O. **Investigations on cider making.** Jour. Bath and West and Southern Counties Soc. **14**: 106–113. 1920.—Mixed-variety ciders are not of as high quality as single-variety ciders. Cider inoculated with a bacterium isolated from ropy cider becomes ropy. The higher the nitrogen content of ciders, the greater the rate of fermentation.—*J. I. Lauritzen.*

4667. Grove, Otto. **Single variety ciders and perries 1919–1920.** Jour. Bath and West and Southern Counties Soc. **15**: 194–199. 1921.—A description is given of the qualities of ciders and perries from various varieties of apples and pears. The article also contains a table showing the specific gravity, rate of fermentation at 25°C., malic acid content, and percentage of tannin of the different ciders and perries.—*J. I. Lauritzen.*

4668. Haley, D. E., and J. F. Lyman. **Castor bean lipase—its preparation and some of its properties.** Jour. Amer. Chem. Soc. **43**: 2664–2670. 1921.—Lipase zymogen of castor bean is present in fats, in very small quantities, as a mixture of fats and ethyl ether. It is not soluble in ethyl ether minus fats. This zymogen is activated by acid. When activated it is unstable and is rapidly destroyed in an acid medium in the absence of fats. It is much more stable in the presence of fats. It is most active at an H-ion concentration of about 1×10^{-5}. Its activity stops at 1×10^{-3}. "Petroleum ether added to a mixture of a hard fat, acid, water, and castor bean lipase accelerates hydrolysis to a great extent. The hydrolysis of oils is similarly somewhat hastened."—*J. M. Brannon.*

4669. Hammer, B. W., and W. A. Cordes. **A study of lactose-fermenting yeasts in "yeasty" cream.** Iowa Agric. Exp. Sta. Res. Bull. 61. *19 p.* 1920.—(1) Lactose-fermenting yeasts were isolated from all of 21 samples of "yeasty" cream secured from 5 states, from 8 (89 per cent) of 9 samples of number 2 cream obtained from Iowa, from 12 (17 per cent) of 71 samples of clean-flavored sour cream coming from Iowa, from 3 samples of milk (2 from Iowa and 1 from Denmark), and from 1 sample of matzun.—(2) The 45 cultures studied were divided into 2 distinct types. These types did not agree closely enough with described organisms so that they could be considered like any of them, and accordingly the names *Torula cremoris* and *Torula sphaerica* are proposed. (3) The data indicate that lactose-fermenting yeasts like those causing a "yeasty" condition in cream are much more common than the number of lots of cream developing "yeastiness" would indicate. It seems evident that the conditions to which cream is usually subjected are not suitable for the development of "foaminess," although such conditions are much more commonly fulfilled in warm weather than in cold. (4) Factors other than presence of lactose-fermenting yeasts and a temperature suitable for their growth that seem to be important in the development of a typical "yeasty" condition in cream are a viscosity, or thickening, due to coagulation, sufficient to prevent too rapid an escape of gas, a decreased solubility of the gas when the fermenting cream is placed at a higher temperature, the closing of the containers, and agitation. (5) Because of the wide distribution of lactose-fermenting yeasts, it does not seem advisable to attempt to keep them out of cream in order to prevent losses. The best thing that can be done at present by the small shipper is to hold cream at temperatures sufficiently low so that the development of the yeasts will be prevented or greatly retarded. Losses in large shipments of cream can undoubtedly be eliminated by efficient pasteurization and this may eventually prove to be a help in the solution of the "yeasty" cream problem.—*Author's summary.*

4670. Horton, Edward. **On the use of taka-diastase in estimating starch.** Jour. Agric. Sci. 11: 240–257. 1921.—The author records the results of extensive tests of the taka-diastase method of starch estimation when used to study the starch content of wheat grown under varied conditions. After perfecting methods which were accurate for the preparation of samples, it was found that while analyses made at any given time could be made to check, thus indicating accuracy of technique, analyses from similar samples analyzed at different times did not check. It was found that it was impossible to secure uniform results with different lots of taka-diastase of with the same lot at different time intervals. Diastase was also prepared from *Aspergillus Oryzae* grown on sterilized wheat bran, and in general the cultures were found to contain the greatest amount of diastase on the 7th day. The addition of asparagin to the culture medium appeared to increase the amount of enzyme produced. The author concludes that the taka-diastase method can not be used unless tests are also made at the same time with a pure starch standard. The evidence points to the persistence of dextrin as the cause of the low values obtained for the apparent starch content.—*V. H. Young.*

4671. Manzoni, Luigi. **Esperienze sulla fermentazione delle frutta di Kaki. [Experiments on the fermentation of Kaki fruit.]** Staz. Sper. Agrarie Ital. 54: 284–288. 1921.—By using the pulp of the Kaki fruit it was found that to obtain good fermentation it was necessary to increase the acidity by means of tartaric acid. The yield in alcohol was 8–9 per cent, but a better product was obtained when to the pulp ¼ its weight of grape must was added. Acetic acid fermentation could also be established with a final yield of 4.89 per cent acetic acid.—*A. Bonazzi.*

4672. Rahn, Otto. **Die Anwendung von Reinkulturen der Mikroorganismen in Industrie und Landwirtschaft. [The use of pure cultures of microorganisms in industry and agriculture.]** Naturwissenschaften 10: 241–246. 1922.—This is a summing up of the advances in the field of industry and agriculture due to the use of pure cultures of microorganisms. The progress in various yeast fermentations as well as dairy bacteriology has been much more rapid than in soil bacteriology, where as yet the use of pure cultures, except in the case of nodule bacteria, is still to be worked out.—*Orton L. Clark.*

4673. Sarin, E. **Beiträge zur Kenntnis der Honigweine. [Honey-wine.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 90–98. 1921.—Analytical methods with tabulation of analytical data on 34 samples are given.—*E. E. Stanford.*

4674. Tillmans, J., R. Strohecker, und W. Schutze. **Studien über den Nachweis beginnender Fleischfäulnis. [The determination of incipient putrefaction in meat.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 65–75. 1921.—The beginning of putrefaction is determined by means of an improvement on the oxygen process of Tillmans and Mildner, and by methods depending on the reduction of nitrates and of methylene blue.—*E. E. Stanford.*

4675. Traetta, Mosca F., e M. Preti. **Azione dell'Aspergillus glaucus sulla glicerina. [The action of A. glaucus on glycerin.]** Gazz. Chim. Ital. 51: 269–277. 1921.—After a brief review of the literature upon the subject of glycerin fermentation the author reports studies on the action of *A. glaucus* on a 3 per cent solution of this compound. A needle-shaped crystalline deposit is formed, composed of a substance fusing at 154°C., found to have an empirical $C_6H_6O_4$. The path of synthesis suggested by the authors is as follows: glycerol → glyceric aldehyde → condensation to dextrose → oxymaltal.—*A. Bonazzi.*

METABOLISM (RESPIRATION, AERATION)

4676. Dixon, H. H., and N. G. Ball. **A determination, by means of a differential colorimeter, of the heat produced during the inversion of sucrose.** Notes Bot. School Trinity Coll. Dublin 3: 121–132. 1922.—Accurate determinations of the heat produced by the action of invertase on sucrose were made by means of a differential colorimeter in which the temperature was measured by means of a thermocouple. The mean of all results was 3.83 cal. per gm.-mol.—*G. B. Rigg.*

4677. König, J., und J. Schneiderwirth. **Beziehungen zwischen den durch Verbrennung und Berechnung ermittelten Wärmewerten der Nahrungsmittel und der Nahrung. [Relationships between calorific values of foodstuffs obtained by combustion and calculation with food values.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel **42**: 3–23. 1921.—This is an extended report, including analytical data, concerning a large number of foodstuffs of animal and vegetable origin.—*E. E. Stanford.*

ORGANISM AS A WHOLE

4678. Callow, Bessie R. **Bacteriophage phenomena with Staphylococcus aureus.** Jour. Infect. Diseases **30**: 643–650. 1922.—The bacteriophage substance has been demonstrated as directly isolable from staphylococcic infection. The cases studied and methods used are described in detail. In 2 of 16 cases of active infection studied the lytic principle was active against the autogenous strain as well as other staphylococcus strains, while in 6 others it proved lytic for 1 or more heterologous strains but not for the homologous strain, notwithstanding repeated tests.—*R. V. Allison.*

4679. Calvino, Eva Mameli. **Studi anatomici e fisiologici sulla canna da zucchero. [Anatomical and physiological studies on sugar cane.]** Staz. Sper. Agrarie Ital. **54**: 345–396. *Fig. 1–19.* 1921.—The author makes a study of various sugar cane varieties in Cuba from the standpoint of seed production. After a short general survey of the results obtained in various countries, a critical review is given of the methods adopted by other investigators for the production of seed-bearing plants. In the experimental part the varieties are carefully described, the author laying special stress upon differential histological characters rather than following the custom of stressing stem characters of only commercial value. The conditions that determine flowering are then studied, temperature, rainfall, and atmospheric humidity being given consideration. Results are given to show that many of the methods for pollen germination are useless in the study of the sugar cane, as is also the method of incubating the pollen upon the moist surface of leaves of *Talinum triangularum, Eichhornia speciosa, Tropaeolum majus, Vinca rosea, Plumbago capensis,* and *Euphorbia pulcherrima,* or upon the stigmas of *Datura arborea, Hibiscus rosa-sinensis, Argemone mexicana,* and *Hippeastrum reginae.* Positive results were, however, obtained when the cane pollen was incubated upon the stigma of *Nicotiana tabacum* var. *havanensis.* It was found that those pollen grains failing to germinate were flaccid and free of starch grains, whereas those which did germinate contained starch; in fact, the physiologically normal and mature grains not only contained starch but were packed with a granular material, some part of which was of lipoid nature. The germination capacity of the seed was about 100 seed in 5000–7000 grains. Several crosses, made for the purpose of obtaining fertile seed, proved satisfactory. The minimum germination time for the seed was 3 days, the maximum 8–10, with an average of 5–6 days. Striking variations were found in the time of flowering of different varieties.—*A. Bonazzi.*

4680. Garner, W. W., and H. A. Allard. **Photoperiodism, the response of the plant to relative length of day and night.** Science **55**: 582–583. 1922.

4681. Goetsch. W. **Hydra und Alge in neuer Zellsymbiose. [Hydra and an alga in a new cell symbiosis.]** Naturwissenschaften **10**: 202–205. *Fig. 1–2.* 1922.—Of the 2 groups of German fresh water polyps the green are due to a symbiosis with green algae and the remainder lack the green color, but show a brown or gray color. The author has taken these brown hydras for his study. He finds under certain conditions of culture the brown color gives way to a green due to the entering into symbiosis of *Zoochlorella.* This alga may spread throughout the body of the polyp or gradually disappear upon culture in darkness or at low temperatures. The question of whether or not a true symbiosis exists is not definitely settled.—*Orton L. Clark.*

4682. Huddleson, I. F. **The importance of an increased carbon dioxide tension in growing Bact. abortum (Bang).** [Abstract.] Absts. Bact. **5**: 16. 1921.

4683. Magrou, J. **La symbiose chez les plantes.** [Symbiosis in plants.] Bull. Inst. Pasteur 20: 169–183, 217–231. *Fig. 1–8.* 1922.—This is a review of the literature upon the question and serves as a survey of the present status. The paper is divided as follows: The Theory of Symbiosis. *Mycorhizae* (ectotrophic and endotrophic); nature of the mycorhizal fungi. Symbiosis and Disease; relation of host and endophyte, phagocytes, humoral immunity. Symbiosis and Tuberization; symptoms of symbiosis, tuberization in orchids, generalizations. The Problem of the Potato; symbiosis and tuberization in the potato, dimorphism. Symbiosis and Evolution; heredity and variation, evolution of the orchids, steps in the evolution of the vascular plants, symbiosis and evolution in thallophytes.—Leaving aside the special sections, and considering only the general conclusions upon the subject of evolution, it may be noted that "the new theory of evolution is somewhat inclined towards the Lamarkian hypothesis, in so far as it gives the preponderant rôle to the environmental conditions in determining the variations, but differs from that hypothesis in so far as it is independent from the obscure notions of heredity of acquired characters, in order to explain the genesis of new characters. The characters acquired through symbiosis are as stable as the conditions determining them, and become stable and fixed when symbiosis becomes obligatory, as in the orchids." A list of the literature is appended.—*A. Bonazzi.*

4684. Mellon, Ralph R. **Spontaneous agglutinability of bacteria in relation to the antagonistic action of certain cations.** Proc. Soc. Exp. Biol. and Med. 19: 247. 1922.—Spontaneous agglutinability of 5 separate cultures of diphtheroid bacilli was shown to be a function of growth-cycle developments.—*M. M. Brooks.*

4685. Nichols, Susan P. **Methods of healing in some algal cells.** Amer. Jour. Bot. 9: 18–27. *1 pl.* 1922.—Cells of *Chara*, *Nitella*, and several of the coarser filamentous algae were punctured with a needle and their reactions studied. All except *Chara* were found to be able to heal the wounds thus made. The density of the protoplasm varied from very liquid to decidedly viscous, and no correlation was found between density of protoplasm and character of cell wall. The protoplasm may be readily diffusible in water or it may be non-miscible with water. In the latter case the film formed outside the escaping cytoplasm seems to be a contact film rather than a true plasma membrane. The puncture is closed by an accumulation of plastids, pyrenoids, and starch grains in the opening. A new plasma membrane is formed slowly within the cell by growth inward from the old membrane. A new cell wall is finally formed by this membrane.—*E. W. Sinnott.*

4686. Tellefsen, Majorie A. **The relation of age to size in certain root cells and in vein-islets of the leaves of Salix nigra Marsh.** Amer. Jour. Bot. 9: 121–139. *3 fig.* 1922.—Cuttings were made from branches of recent growth in 80 trees of *S. nigra* of different ages, the diameter of the trunk 6 inches from the ground being used as a guide to the relative age of the tree. These cuttings were rooted in jars of water, and cell size was measured in the roots arising from them. Paraffin sections were used, care being taken to study comparable material.—Cuttings from young trees produced roots and leaves sooner than did those from older trees. The age of the parent tree also seemed to affect the size of the cells in the roots from the cuttings,—(1) the epidermal and cortical cells growing smaller with increasing age of the parent tree, (2) xylem and meristematic cells growing larger, and (3) endodermal and phloem cells decreasing in size tangentially and increasing radially. Leaves of trees of different ages were examined and the average area of vein-islets in older trees was found to be smaller than in younger ones.—*E. W. Sinnott.*

GROWTH, DEVELOPMENT, REPRODUCTION

4687. Barker, B. T. P. **Factors governing fruit bud formation.** Jour. Bath and West and Southern Counties Soc. 15: 115–116. 1921.—This is a progress report.—*J. I. Lauritzen.*

4688. Barker, B. T. P., and A. H. Lees. **Factors governing fruit bud formation.** Jour. Bath and West and Southern Counties Soc. 14: 172–180. 1920.—The factors influencing growth of buds from a last year's shoot in apples and pears are temperature, inhibition of lateral buds by the flowing downward through the stem of substances produced by the terminal buds and leaves, bud strength, root action, and varieties.—*J. I. Lauritzen.*

4689. Barker, B. T. P., and A. H. Lees. **The effect of notching and ringing on apple trees.** Jour. Bath and West and Southern Counties Soc. 14: 180–187. 1920.—Ringing in May causes growth in buds that would otherwise remain dormant, the effect being most marked immediately below the ring; but there is some tendency for the stimulus to be accentuated at the base of the twig. The growth of the bud is partly dependent upon its original strength. A knife edge ring on 1-year-old wood causes 1 or more buds situated immediately below to grow more actively. The ringing of every 3rd internode showed considerable weakening of the stimulus in the lower internode. The distance of the influence by the ring is affected by how long the ring remains unbridged by callus, which is governed by the width of the ring and the degree of growth activity.—*J. I. Lauritzen.*

4690. Priestley, J. H., and A. F. C. H. Evershed. **Growth studies. I. A quantitative study of the growth of roots.** Ann. Botany 36: 225–237. *6 fig.* 1922.—Data on root growth in terms of weight are presented in the form of tables and curves. Cuttings of *Tradescantia* and tomato were used. The curves are in the form of successive *S's*. The transition from one *S* to the next coincides with the appearance of a crop of rootlets. A single *S* corresponds to the Sachs' "grand period" curve and with appropriate methods of measurement the growth of roots presents a series of such "grand period" curves.—*W. P. Thompson.*

4691. Priestley, J. H., and W. H. Pearsall. **Growth studies. II. An interpretation of some growth curves.** Ann. Botany 36: 239–249. *4 fig.* 1922.—The *S* type of curve so often obtained in growth studies is considered. Robertson's comparison of this type with that of an autocatalytic chemical reaction is discussed. The first exponential portion of the curve is considered to represent the exponential increasse in size of the apical meristem. The mass increase then becomes proportional to time, probably because the supply of root-forming material is delivered at a uniform rate. The final decrease in growth is coordinated with the initiation of lateral meristems.—*W. P. Thompson.*

4692. Schaffner, John H. **Control of the sexual state in Arisaema triphyllum and Arisaema Dracontium.** Amer. Jour. Bot. 9: 72–78. 1922.—In *Arisaema triphyllum* it was found that sex is readily reversible. An environment which favors rank and vigorous growth tends to bring on a carpellate condition and an unfavorable environment a staminate one. From one season to another the sex of the same plant may be changed from male to female or from female to male merely by modifying the environment. A similar reversal, though not so strongly marked, was observed in *Arisaema Dracontium.* The author concludes that sex in *Arisaema* is dependent on a functional state and not on hereditary factors.—*E. W. Sinnott.*

4693. Waldron, L. R. **Rate of culm formation in Bromus inermis.** Jour. Agric. Res. 21: 803–816. 1921.—The rate of increase is not fixed but takes place at an accelerating rate. An equation is developed which expresses the rate of increase. The resulting curve is of the parabolic type.—It is not evident that the compound interest law has any real organic significance when applied to culm formation in *Bromus inermis.*—*D. Reddick.*

4694. Weaver, J. E., F. C. Jean, and J. W. Crist. **Development and activities of roots of crops plants: a study in crop ecology.** Carnegie Inst. Washington Publ. 316. *117 p., 14 pl., 42 fig.* 1922.—This paper reports a continuation of work discussed in the authors' Root Development in the Grass Land Formation, Carnegie Inst. Washington Publ. 292. The studies were conducted during the growing seasons of 1919–21, at Peru and Lincoln, Nebraska; Phillipsburg, Kansas; and Burlington, Colorado. The plants investigated were oats, wheat, barley, maize, potato, alfalfa, and sweet clover. After presenting the detailed data regarding root development and distribution in the field, an experimental study is reported on the depths at which plants absorb water and nutrient salts.—Some of the conclusions follow: The small cereals are characterized by having root systems with 2 more or less distinct parts or regions. The roots of one part spread laterally in all directions and remain within 30 or 40 cm. of the soil surface. Those of the other part develop vertically downward and penetrate deeply (180 to 210 cm.). Potato roots at first spread in the superficial 30 cm. of soil; later the ends of these roots turn downward and penetrate to greater depths. A direct correlation was observed between the development of both tops and roots of these crop plants and that of the native vegetation growing in the same general environment.—The roots experimentally studied absorbed water and nitrates at various depths in the soil, about proportionally to the number of roots occurring at the different depths. Maize absorbed water from a depth of over 150 cm., potato from a depth of over 70 cm. Barley removed nitrates from depths of 80 or 90 cm. In the field the roots studied penetrated to depths of from 60 to 150 cm., or even to 180 cm., according to the environmental conditions, and it seems clear that water and salts were absorbed in considerable quantities from the deeper soil layers penetrated.—*R. P. Hibbard.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

4695. Birch, J. J. **Important movements of plants.** Amer. Bot. 28: 55–58. 1922.

4696. Blackman, V. H. **The theory of geotropic response.** New Phytol. 20: 246–247. 1921.—This is an answer to Small's reply [see Bot. Absts. 11, Entry 716.] to previous criticism by Blackman.—*I. F. Lewis.*

4697. Newcombe, F. C. **Significance of the behavior of sensitive stigmas.** Amer. Jour. Bot. 9: 99–120. 1922.—Twenty-five species are known to have sensitive stigmas, 4 being reported here for the 1st time. In each case the stigma is composed of 2 divergent lobes. Under the stimulus of pressure—normally from the body of an insect—these lobes close. A light touch will not cause this response. The lobes are sensitive on their inner surfaces only. Temperature and other factors influence the rate of response. The author points out that this closing of the stigma is obviously an aid in securing cross pollination. In many cases the stigma opens again after having closed, and after a few hours closes again; the pollen now begins to germinate. By a series of experiments the author endeavored to find what maintains this closing of the stigma. Inorganic powder, such as emery flour, does not keep the stigma closed, but dead pollen, starch, flour, and taka diastase considerably retard its opening. In general, nothing keeps the stigma closed so well as does living pollen. The author does not believe that withdrawal of water from the lobes maintains their closed condition but suggests that an absorbing substance on the stigma increases the permeability of the protoplasm there and that this produces the effect. A list of plants with sensitive stigmas is appended.—*E. W. Sinnott.*

4698. Snow, R. **The hydrion theory of geotropism.** New Phytol. 20: 247–248. 1921.—Small's hydrion theory [see Bot. Absts. 7, Entry 1366; 10, Entries 298–301] is criticized on the basis of electrical phenomena in the tissues.—*I. F. Lewis.*

4699. Tröndle, Artur. **Untersuchungen über das Sinusgesetz bei den geotropischen Reaktionen von Lepidium. [The law of the sine in the geotropic reactions of Lepidium.]** Jahrb. Wiss. Bot. 60: 295–306. 1921.—The author used the roots of seedlings of *Lepidium sativum* to test the validity of this law. Three methods were employed: (1) The method of the compensation klinostat, (2) the determination of the presentation time, and (3) the determination of the reaction time. The results obtained by all 3 methods were the same, namely, they confirmed the validity of the law at all angles of exposure, great or small.—*F. C. Newcombe.*

REGENERATION

4700. Loeb, Jacques. **Quantitative laws in regeneration. The quantitative basis of polarity in regeneration.** Jour. Gen. Physiol. 4: 447–461. *Fig. 1–8.* 1922.—A long piece of defoliated stem of *Bryophyllum calycinum* placed in a suitable environment forms shoots only at the apical or 2 apical nodes, while when such a stem is cut into as many pieces as there are nodes each node produces a shoot. It is shown by the author that the dry weight of shoots produced in the apical nodes of a long piece of stem is approximately equal to the dry weight of shoots the same stem would have produced had it been cut into as many pieces as it possesses nodes. The author concludes that all the material which can be used for the growth of shoots goes into the most apical part of the stem.—*O. L. Inman.*

TEMPERATURE RELATIONS

4701. Johnston, Earl S. **Undercooling of peach buds.** Amer. Jour. Bot. **9:** 93–98. *1 fig.* 1922.—By means of a thermo-electrical method the extent of undercooling of fruit buds of Elberta and Greensboro peach trees, when exposed to the low temperatures of freezing mixtures, was determined. Measurements were made from late January to the middle of March. The temperature at which crystallization began was recorded as was also that of the undercooling, while that reached immediately after crystal formation was recorded as the freezing point. The temperature for both these points rose with the approach of spring. Although Elberta is regarded as less hardy then Greensboro, experiment showed practically no difference between them until shortly before the petals opened, when the undercooling temperature of Elberta rose markedly. Other data showed that wet buds freeze at a higher temperature than dry buds, but that there is little difference between buds which had been sprayed and those which had not.—*E. W. Sinnott.*

4702. Rosa, J. T., Jr. **Relationship of water-retaining capacity to hardiness.** Proc. Amer. Soc. Hort. Sci. **18:** 166–169. 1921 [1922].—By the use of the dilatometer it was found that a smaller percentage of moisture is frozen in hardy than in tender cabbage plants. "As the temperature is lowered from 3–6°C. there is a progressive increase in the per cent of the total water content frozen, but the increase rapidly becomes less and less for each degree of temperature lowering. . . Likewise the actual amount of water remaining unfrozen in hardy leaves is much greater than in tender leaves though the initial moisture content of the hardy leaves is the smaller." More water froze in leaves of tomato and sweet potato than in leaves of cauliflower growing under the same condition. A study of the relative transpiration rates of hardened and tender plants under the same environmental condition showed that more water was transpired per square m. per hour by the tender plants. Drying leaves of hardy and tender plants in an oven and determining rate of water loss showed that hardy leaves hold water more tenaciously. Increase in percentage of dry weight, increase in sugar content, and increase in pentosan content, especially the hot-water-soluble fraction, accompany the hardening process, but the increased water-retaining power of hardened plants is thought to be largely due to the force with which water of inbibition is held by the colloidal pentosans.—*H. A. Jones.*

RADIANT ENERGY RELATIONS

4703. Mashimo, Toshikazu. **A method of investigating the action of ultraviolet rays on bacteria.** Mem. Coll, Sci. Kyoto Imp. Univ. **4:** 1–11. *Pl. 1.* 1919.—In this work a quartz spectrograph was employed, the photographic plate being replaced by a thin culture medium on a glass plate inoculated with non-pathogenic bacteria. The action of the ultraviolet rays was evident after incubation of the exposed culture, as the region in which the bacteria were killed became transparent. The bactericidal effect of light begins suddenly at 295 $\mu\,\mu$, reaches a maximum at about 275 $\mu\,\mu$, and then decreases slowly to the lower limit at about 186 $\mu\,\mu$. The sterilizing rays do not leave any residual toxic effect. Negative results were obtained in testing the effect of ultraviolet rays on taka diastase, pancreatin, catalase, and oxidase.—*E. H. Toole.*

4704. Pincussen, Ludwig. **Biologische Lichtwirkungen, ihre physikalischen und chemischen Grundlagen. [Biological light effects, the physical and chemical principles underlying them.]** Ergebnisse der Physiol. **19:** 79–289. 1921.—This is an extensive study with a bibliography of over 700 references. The following subject headings will give an idea of the scope of this article: I. Physical principles of light effects, including under this heading spectral absorption, fluorescence, photo-electric phenomena, light and colloid formation, and photometry. II. Chemical light effects, including under this heading a discussion of isomerisation, polymerisation, oxidation and reduction, photolysis, photosynthesis, and the physical chemistry of light effects. III. Biological light effects, with a discussion of the taking up of light by the living substance, influence of color, pigments, regulation of the taking up of light, and the path of light entrance. The light effect as related to the growth of plants and animals is next considered, together with photo-dynamic effects. The sub-heading Light and Metabolism includes a general discussion as well as special consideration of ferments, toxins, and antibodies. Lastly, under biological light effects, Pincussen discusses the various reactions of plants and animals to light stimuli.—The paper is a reference work for investigators.—*Orton L. Clark.*

TOXIC AGENTS

4705. Churchman, John W. **The selective bactericidal effect of acid fuchsin and sodium chloride.** Proc. Soc. Exp. Biol. and Med. **19**: 288–290. 1922.—The commoner Gram-negative organisms when subjected to long exposure of gentian-violet survive, while Gram-positive organisms are killed. This is also true of other basic dyes of the tri-phenyl-methane group. The opposite is true of acid fuchsin, ponceau P. R., and sodium chloride. Evidence thus far gathered would indicate that the mechanism by which growth is inhibited may be entirely different from the mechanism by which organisms are killed.—*M. M. Brooks.*

4706. Holm, George E., and James M. Sherman. **Salt effects in bacterial growth.** [Abstract.] Absts. Bact. **5**: 6. 1921.—*Bacterium coli* is stimulated by 0.2 mol. concentrations of sodium chloride, iodide, nitrate, sulphate, and lactate, while it is depressed by the fluoride, acetate, oxalate, and citrate.—*D. Reddick.*

4707. Kaufmann, H. P. **Notiz über die baktericide Wirkung der Brenzschlinnsäure. [Note concerning the germicidal action of pyromucic acid.]** Ber. Deutsch. Chem. Ges. **55**: 289–290. 1922.—A concentration of from 0.5 to 1 per cent of pyromucic acid kills *B. coli* in grape sugar bouillon in 5 minutes, while 0.1 per cent kills the organism in 7 hours.—*Henry Schmitz.*

4708. Macht, David I., and Marguerite Livingston. **Effect of cocaine on the growth of Lupinus alba: a contribution to "phytopharmacology."** Proc. Soc. Exp. Biol. and Med. **19**: 235–236. 1922.—Seed of *Lupinus alba* were soaked in water and allowed to sprout and placed in nutrient salt solutions to which cocaine hydrochloride had been added. It was found that a concentration of 2 per cent was necessary to inhibit growth. Ecgonin hydrochloride inhibited growth at a concentration of 0.0055 per cent; benzoyl ecgonin at 2.5 per cent; and methyl alcohol at a concentration of 4.8 per cent. The most toxic product of cocaine was sodium benzoate, which was deleterious at a concentration of 0.0007 per cent; while ester methyl-benzoate was found to produce inhibition at 0.014 per cent.—*M. M. Brooks.*

4709. Macht, David I., and Marguerite B. Livingston. **Effect of cocaine on the growth of Lupinus albus. A contribution to the comparative pharmacology of animal and plant protoplasm.** Jour. Gen. Physiol. **4**: 573–584. 1922.—The toxic effects of cocaine and its decomposition products on the growth of young roots of *Lupinus albus* were shown to be less than has been found to be the case for animals. Sodium benzoate proved to be more toxic than cocaine for plant roots as measured by the amount of their growth, but the former is usually considered practically non-toxic for animals.—*O. L. Inman.*

MISCELLANEOUS

4710. Heimhalt, Hans Hofer von. **Die Entstehung des Torfes und der Kohle. [The origin of peat and coal.]** Naturwissenschaften **10**: 113–116. *Fig. 1–3.* 1922.—This is a discussion of the chemical and physical changes involved in the conversion of cellulose to peat, and the successive changes of peat to brown coal, bituminous, and hard coal.—*Orton L. Clark.*

4711. MICHAELIS, L. **Die Bestimmungen der Wasserstoffzahl in Trink- Fluss- und Meerwasser mit Indikatoren ohne Puffer. [Determination of hydrogen-ion concentration in drinking-water, river-water, and sea-water with indicators without buffers.]** Zeitschr. Untersuch. Nahrungs-u. Genussmittel **42**: 75–80. 1921.—*M*-nitrophenol is used as an indicator. It is colorless in acid and yellow in alkaline solution. In solutions of known pH its tint varies definitely between colorless and extreme yellow. Experimental methods and formulae are given.—*E. E. Stanford.*

4712. TILLMANS, J. **Über die aggressive Kohlensäure und die Wasserstoffionenkonzentration bei der Wasseruntersuchung. [Active carbonic acid and hydrogen-ion concentration in water investigations.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel **42**: 98–104. 1921.

SOIL SCIENCE

A. G. MCCALL, *Editor*

(See also in this issue Entries 3269, 3272, 3276, 3283, 3285, 3288, 3309, 3311, 3315, 3317, 3318, 3319, 3342, 3343, 3344, 3349, 3353, 3355, 3361, 3362, 3364, 3370, 3375, 3410, 3447, 3462, 3464, 3467, 3469, 3473, 3510, 3607, 3613, 3692, 3701, 3702, 3706, 3709, 3711, 3739, 3740, 3746, 3748, 3750, 3755, 3757, 3777, 3943, 3989, 4000, 4057, 4060, 4179, 4306, 4307, 4343, 4412, 4483, 4533, 4615, 4618, 4620, 4658, 4694)

4713. ANONYMOUS. [Rev. of: RUSSELL, E. J. **Soil conditions and plant growth.** *xii + 406 p., 5 pl., 28 fig.* Longmans, Green & Co.: London, 1921.] Sci. Prog. **16**: 489–490. 1922.

4714. ANONYMOUS. **Nitrogen problem.** [Rev. of: **Statistical supplement to the final report of the nitrogen products committee of the Ministry of Munitions.** Department of Scientific and Industrial Research: H. M. Stationery Office, 1921.] Nature **108**: 439–441. 1921.—The entire report constitutes one of the most valuable lessons of the war.—*O. A. Stevens.*

4715. ATKINS, W. R. G. **Some factors affecting the hydrogen ion concentration of the soil and its relation to plant distribution.** Notes Bot. School Trinity Coll. [Dublin] **3**: 133–177. 1922.—The theoretical maximum alkalinity due to calcium carbonate (pH 9.01) may be attained experimentally in the absence of carbon dioxide, but owing to the high content of this gas in soil the pH values of limestone soils are usually lower and vary with the aeration. Dolomitic soils may attain to a greater alkalinity than limestone soils since the theoretical maximum for magnesium carbonate is pH 10.0. Alkalinity of over pH 10.0 may be reduced to pH 8.0 by the addition of calcium sulphate. The former reaction is injurious to plant cells, while the latter is favorable to most plants. Soil acidity may be occasioned by the oxidation of sulphur from iron pyrites.—Owing to production of carbonic acid by bacteria, a soil extract may decrease in alkalinity from pH 8.7 to 7.2 or less. An acid soil extract is only slightly altered by boiling (pH 5.4 to 5.7 in 1 instance). In order of decreasing alkalinity soils derived from different materials stand as follows: calcareous silt, limestone, sandstone, calcareous tuff (Schlastein) with slate, slate, pillow lava (spilite), felsite, and granite.—The H-ion concentrations of the habitats of over 100 native plants are given, many of them limited to a short range of pH values. Others, with a wider range, occur mainly in one portion of it, but some plants grow well at widely different soil reactions. A distinction must be made between acid peaty soils, acid clay soils, and acid sandy soils.—The successful cultivation of wild flowers in gardens is dependent upon maintaining the soil reaction of the natural habitats. Natural waters, even from the peaty districts examined, contain no acid other than carbons.—*G. B. Rigg.*

4716. Benton, T. H., and Hugh B. Woodroffe. **Soil survey, Madison County, Iowa.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1918: 5-38. *Fig. 1, map (colored).* 1921.

4717. Burke, R. T. Avon, and Herbert F. McCall. **Soil survey of Washington County, Maryland.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1917: 5-44. *Fig. 1, map (colored).* 1920.

4718. Bushnell, T. M., and Wendell Barrett. **Soil survey of Lake County, Indiana.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1917: 5-45. *Fig. 1, map (colored).* 1921.

4719. Comber, Norman M. **The flocculation of soils. II.** Jour. Agric. Sci. 11: 450-471. 1921.—A continuation of the author's study of flocculation [see Bot. Absts. 8, Entry 1533]. Clay is regarded as a system consisting of particles "protected" by emulsoid particles. A clay particle suspended in water is pictured as having a solid nucleus surrounded by a layer of gel material. Three types of flocculation of clay are recognized: (1) Normal or direct flocculation. The isoelectric point theory is assumed for this type. Iron and aluminum salts are believed to be active agents. (2) Indirect flocculation, which takes place wherever the electrolyte reacts with the clay and thereby brings into solution from the clay other substances which cause flocculation. The action of some neutral salts and of acids is regarded as being largely indirect. (3) Abnormal flocculation, which is the result of a reaction between the added flocculent and the emulsoid surface of the clay particle. The action of calcium hydroxide is conceived to be of this type. An extensive discussion of this point is given.—*V. H. Young.*

4720. Dacy, G. H. **Potash, an essential for plant growth. The wide scattering and the low concentration of America's deposits, and what we can do about it.** Sci. Amer. 126: 106-107. *4 fig.* 1922.

4721. Davis, L. Vincent, and J. Ambrose Elwell. **Soil survey Louisa County, Iowa.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1918: 5-47. *Fig. 1, map (colored).* 1921.

4722. Dean, Walter C. **Soil survey of the Willits area, California.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1918: 5-31. *Pl. 1-2, fig. 1, map (colored).* 1920.

4723. Dunn, J. E., J. M. Snyder, and Elwood Hoffecker. **Soil survey of Kent County, Delaware.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1918: 5-31. *Fig. 1, map (colored).* 1920.

4724. Engle, C. C., L. L. Lee, H. A. Miller, Austin L. Patrick, J. M. Snyder, and Howard C. Smith. **Soil survey of the Millville Area, New Jersey.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1917: 5-43. *Pl. 1-8, fig. 1-2, map (colored).* 1921.

4725. Fisher, F. A. **Soil reaction.** Sci. Prog. 16: 408-425. 1922.—A brief review is presented of the history of theories on soil acidity, grouped as: (A) humic acid theory, (B) selective adsorption theory, (C) basic exchange theory, (D) mineral acid theory. Methods that have been proposed for determining soil acidity are listed. There is an explanation of the distinction between acidity and lime requirement of a soil, of the effect of liming on general fertility, and the part played by acidity on the general soil-plant economy. The possible dangers from over-liming are also presented. Soil acidity should be correlated with the physicochemical conceptions of acidity, i.e., the pH. The nature of buffer action, as exemplified by the soil colloids, is explained. From a study of Clark and Lubs titration curves for orthophosphoric acid it is found that there is considerable buffer action between pH 7.4 and 6.2 which covers the reaction of normally fertile soils; this suggests that acid phosphate may be a reaction regulator in light soils. A method for determining pH values, properly standardized, should be of great usefulness for the study of soil reaction, lime requirement, and the relation of H-ion concentration to plant distribution.—*F. M. Scales.*

4726. Hawker, H. W., F. A. Hayes, J. F. Stroud, and Neal Gearreald. **Soil survey, Freestone County, Texas.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–56. *Fig. 1, map* (*colored*). 1921.

4727. Hayes, F. A., and H. L. Bedell. **Soil survey of Banner County, Nebraska.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1919:** 5–60. *Fig. 1, map* (*colored*). 1921.

4728. Hayes, F. A., H. W. Hawker, M. D. Davis, and V. H. Seabury. **Soil survey Morrill County, Nebraska.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1917:** 5–67. *Fig. 1, map* (*colored*). 1920.

4729. Hayes, F. A., Louis A. Wolfanger, H. L. Bedell, L. Britton, S. C. H. Taylor, and F. M. Deutsch. **Soil survey of Sheridan County, Nebraska.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–58. *Pl. 1–2, fig. 1, map* (*colored*). 1921.

4730. Hurst, Lewis A., E. W. Knobel, and B. H. Hendrickson. **Soil survey of the Aroostook area, Maine.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1917:** *Pl. 1–4, fig. 1, map* (*colored*). 1921.

4731. Hutton, F. Z., W. E. Tharp, and Clarence Lounsbury. **Soil survey of Simpson County, Mississippi.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1919:** 5–32. *Fig. 1, map* (*colored*). 1921.

4732. Jones, E. Malcolm, and G. W. Musgrave. **Soil survey of Pearl River County, Mississippi.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–36. *Pl. 1–3, fig. 1, map* (*colored*). 1920.

4733. Joseph, A. F., and F. J. Martin. **The determination of clay in heavy soils.** Jour. Agric. Sci. **11:** 293–303. 1921.—The standard methods for the determination of clay in soils in use in England and America are compared with the Sudan method as described by Beam in the Cairo Sci. Jour. for 1911 [abstracted in Exp. Sta. Rec. 25: 513]. This method, although apparently little used, offers many advantages over the American and English methods. The essential points of the method lie in (a) the use of sodium carbonate instead of ammonia as a deflocculating agent, and (b) the use of a camel's hair brush for puddling clay. No preliminary acid treatment is used, the height of the sedimentation column is 10 cm., and the time of subsidence 8 hours. The Sudan sedimentation method can be carried out in about ½ the time of the English method, and the centrifugal in about ⅓ the time required for the American. For general use the sedimentation method is preferred as requiring less attention.—*V. H. Young.*

4734. Jurney, R. C., and S. O. Perkins. **Soil survey, Wilkes County, North Carolina.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–38. *Fig. 1, map* (*colored*). 1921.

4735. Keen, Bernard A. **The evaporation of water from soil II. The influence of soil type and manurial treatment.** Jour. Agric. Sci. **11:** 432–440. *Fig. 1–2.* 1921.—This paper deals with the evaporation from 2 types of soil,—one containing 6 per cent of clay and the other 15 per cent of clay,—from fields at Woburn and Rothamsted. The technique was the same as that previously used by the author [Jour. Agric. Sci. 6: 456. 1914]. Soils were taken from the following types of plots in both cases: (a) unmanured plots; (b) manured with farmyard manure; (c) manured with complete artificial manure. The author states that "the rate at which the soils lost water over concentrated sulphuric acid and at a constant temperature, was found to depend firstly on the amount of clay present, and secondly on the amount of organic matter in the soil. The differences due to content of organic material were more obvious in the soil containing the larger amount of clay; the farmyard manure plot lost water at the slowest rate, and the unmanured plot occupied an intermediate position. In the sandy soil, the differences in evaporation due to manuring were small. There is evidence that the moisture equivalent of these soils measures the percentage of water at which the evaporation is first directly affected by the soil particles, and that at percentages of water in excess of the moisture equivalent evaporation is taking place substantially from a free water surface."—*V. H. Young.*

4736. Keen, Bernard A., and Henry Raczkowski. **The relation of the clay content and certain physical properties of a soil.** Jour. Agric. Sci. 11: 441–449. *Fig. 1–5.* 1921.—Methods are described for determining the following properties of a soil: (1) weight of unit volume (100 cc.) of air-dry soil, or the apparent specific gravity; (2) amount of water taken up by unit weight of soil; (3) pore space; (4) specific gravity of the soil; (5) the volume expansion of unit volume (100 cc.) of soil when saturated. Soil is packed by hand into small brass boxes after being passed through a sieve having 100 meshes to the inch. One particular soil was used but samples were taken from different depths. It was shown that both apparent and real specific gravity varied inversely with the percentage of clay in the soil, while moisture capacity, pore space and coefficient of expansion varied directly with the clay percentage. The effect on the constants of the larger quantities of organic matter present in the top layers of soil was, weight for weight, approximately equal to that of the clay, except in the volume expansion results where the effect, if any, was within the experimental error. It is possible that the fraction fine silt II, whose upper limit of diameter is 0.005 mm., has effects similar to those of the clay fraction.—*V. H. Young.*

4737. Keen, B. A., and E. J. Russell. **The factors determining soil temperature.** Jour. Agric. Sci. 11: 211–239. *Fig. 1–13.* 1921.—The discussions of this paper are based on the readings of a continuous self-recording thermometer buried 6 inches in the soil at Rothamsted and by the readings of a series of other thermometers exposed in a screen open to the air or buried in the soil. Records for 1 year were also kept of data from sunshine and radiation recorders. The curves obtained in summer differ from those obtained in winter,—marked daily variations occurring in the summer but not during the winter. During the summer the rise in temperature begins at daybreak and penetrates to 6-inch depth at about 9:30 a.m., and there is then a continuous rise until about 4:30 p.m. At 5:30 p.m. a slow fall begins lasting until about 8 a.m. The temperature is thus seen to rise for about 7 or 8 hours and to fall for 15 or 16 hours. The mean temperature is passed about midday and again at about midnight; thus the warm period in the soil is from midday to midnight. The soil maximum occurs about 3 hours after the air maximum in the shelter screen. The maximum soil temperature is not closely correlated with the number of hours of sunlight, the coefficient for the whole period being .434 ± .032. However, the extent of temperature rise at about 6-inch depth is closely correlated with the amount of solar radiation as recorded by the Wilson radiointegrator (correlation coefficient = + .877 ± .009) and to a less extent (correlation coefficient = +.768 ± .015) with the hours of sunshine. The extent of daily rise is adversely affected by rainfall but apparently not by wind. No evidence was secured to show that rainfall increases the maximum temperature. While the surface of the soil rises to a temperature considerably above that of the air, at a 6-inch depth the temperature maximum is about the the same as that of the air during the summer. During the winter the temperature maximum at the 6-inch depth is about 3°C. lower than that of the air. The cooling of the soil is increased by clear nights but is retarded during autumn by rainfall. There is appended a description, with a diagram, of the special recording soil thermometer and the other instruments used.—*V. H. Young.*

4738. Kerr, J. A. **Soil survey, Fayette County, West Virginia.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1919:** 5–28. *Fig. 1, map (colored).* 1921.

4739. Krusekopf, H. H., E. W. Knobel, and C. E. Deardorff. **Soil survey of Francois County, Missouri.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–31. *Pl. 1–2, fig. 1, map (colored).* 1921.

4740. Latimer, W. J., T. M. Morrison, and F. Z. Hutton. **Soil survey, Newberry County, South Carolina.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–43. *Fig. 1, map (colored).* 1921.

4741. Lipman, J. G., and A. W. Blair. **A comparative study of the value of nitrate of soda, leguminous green manures and stable manure in cylinder experiments 1907–1919.** Jour. Agric. Sci. **11:** 323–336. *Pl. 4–5, fig. 1.* 1921.—Comparative tests (in New Jersey) of nitrogen in nitrate of soda, stable manure, and leguminous green manure crops on 8 types of soil, of which 7 are Coastal Plain soils, were made. The 5 treatments used were as follows: (1) no fertilizer; (2) minerals only (phosphoric acid and potash); (3) minerals and leguminous green manure crops to supply nitrogen for the 4 main crops; (4) minerals and stable manure. All cylinders received liberal applications of ground limestone every 5 years. The rotation consisted of rye, corn, potatoes, and oats all grown every year on the 8 soils.—Under all of the treatments, the largest crops were obtained during the first 2 or 3 years of the period. Since then there has been a gradual diminution of yield so that the average yields for the 13-year period are without exception less than for the averages for the first 7 years. This applies to both the total dry matter and the total nitrogen. The soils used have varied considerably in their yield. Of the 5 different treatments, the green manure series has given the highest average returns on all soils, although in a few cases scattered through the 13 years the nitrate of soda series gave the largest yield. The average yield of the nitrate series stands between the green manure and the stable series. It has been shown that for a period of 13 years nitrogen supplied by leguminous green manure crops, grown between the main crops of the rotation, has been more effective in crop production than 15 tons of manure every 2 years, while at the same time the nitrogen content of the soil of the green manure series was maintained, for a period of 5 years at least, on a level with that of the stable manure series. It was shown that the green manure series yielded larger crops than the nitrate of soda series and at the same time the nitrogen content of the soil was maintained at a higher level. The authors point out in conclusion that it may be possible to maintain crop yields at a rather high level, even when the total nitrogen content of the soil is not kept quite so high as was found in the original soil.—*V. H. Young.*

4742. Long, David D. **Soil survey, Floyd County, Georgia.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1917:** 7–70. *Fig. 1, map (colored).* 1921.

4743. Long, David D. **Soil survey of Madison County, Georgia.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–31. *Fig. 1, map (colored).* 1921.

4744. Long, David D., and E. C. Hall. **Soil survey Early County, Georgia.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–41. *Fig. 1, map (colored).* 1921.

4745. Long, David D., and N. M. Kirk. **Soil survey of Lowndes County, Georgia.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1917:** 5–35. *Fig. 1, map (colored).* 1920.

4746. Lounsbury, Clarence, and R. F. Rogers. **Soil survey of LaSalle Parish, Louisiana.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–40. *Fig. 1, map (colored).* 1920.

4747. Lounsbury, Clarence, T. H. Benton, and P. C. Wiechmann. **Soil survey, Adair County, Iowa.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1919:** 5–25. *Fig. 1, map* (*colored*). 1921.

4748. Martin, Thomas Lysons. **Decomposition of green manures at different stages of growth.** New York Agric. Exp. Sta. [Cornell] Bull. 406. *137–169, fig. 26–35.* 1921.—Rye, oats, and buckwheat, at 3 stages of maturity and while still fresh, were cut into 1-inch lengths and mixed with Dunkirk clayey silt loam and incubated 4–12 months. The experiments covering a period of 3 years were carried out in 1-gallon jars kept at constant temperature in the greenhouse. The rate of decomposition was determined by (1) rate of humus formation; (2) accumulation of nitrates; (3) availability of plant nutrients to a wheat crop. It was found that the breaking down of crude organic matter involved 3 phases: (a) a period of humus formation with lack of formation of end products; (b) humic decomposition wherein the end products are formed as rapidly as the humus is produced; (c) humic decomposition wherein the end products are greater than the humus formation. It appeared that the greater the succulency of the green manure when incorporated into the soil the greater the amount of humus formed; also the decomposition was most rapid when the crop was in the early blooming period. Nitrification went on most rapidly with the succulent material. Wheat crops on treated soil were stimulated most where succulent additions had been made. Buckwheat, particularly in the mature stages, decayed more readily than did rye or oats of a corresponding maturity.—*W. O. Gloyer.*

4749. Maxon, E. T., and N. M. Kirk. **Soil survey of Pierce County, Georgia.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5-28. *Fig. 1, map* (*colored*). 1920.

4750. Meyer, A. H. **Soil survey of Pulaski County, Georgia.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–24. *Fig. 1, map* (*colored*). 1920.

4751. Meyer, A. H., and E. I. Angell. **Soil survey, Marshall County, Iowa.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–34. *Fig. 1, map* (*colored*). 1921.

4752. Nelson, J. W., Walter C. Dean, and E. C. Eckmann. **Soil survey, Upper San Joaquin Valley, California.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1917:** 7–113. *Pl. 1–4, fig. 1, map* (*colored*). 1921.

4753. Nelson, J. W., J. E. Guernsey, L. C. Holmes, and E. C. Eckmann. **Reconnoissance soil survey of the Lower San Joaquin Valley, California.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1915:** 7–155. *Pl. 1–3, fig. 1, map* (*colored*). 1918.

4754. Nelson, J. W., Walter C. Dean, A. E. Kocher, E. B. Watson, and E. J. Carpenter. **Soil survey of Ventura area, California.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1917:** 5–84. *Pl. 1–3, fig. 1, map* (*colored*). 1920.

4755. Noyes, H. A. **Cultivation and soil moisture.** Science **55:** 610–611. 1922.—On the basis of field experiments, the writer concludes that one of the important results of cultivation is increase in bacterial activity "which in turn gives increased concentration of the soil solution."—*C. J. Lyon.*

4756. Oldershaw, A. W. **The effect of basic slag upon grassland and upon the corn crops obtained when that grassland is ploughed up.** Jour. Agric. Sci. **11:** 287–292. 1921.—The use of basic slag at the rate of 1000 pounds per acre twice during a period of 8 years on a chalky boulder clay was found to have greatly increased the nitrogen content of the soil and the crops raised on it. The increase in nitrogen in the fertilized plot over that in an unfertilized check plot was attributed to the great increase in the growth of wild white clover in the former. When grazed, the fertilized plots yielded a considerably greater amount of mutton.

During the last year of the experiment it was found that the excessive growth of vegetation on the fertilized plots over those not fertilized resulted in a seed-bed unfavorable for wheat on account of the dryness of the season whereas the unfertilized plot provided a better seed-plot for wheat under these conditions.—*V. H. Young.*

4757. O'Neal, A. M. Jr., and D. S. Gray. **Soil survey, Cedar County, Iowa.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1919:** 5–33. *Fig. 1, map* (*colored*). 1921.

4758. O'Neal, A. M. Jr., F. O. Hooton, and T. M. Bushnell. **Soil survey of Fayette County, Alabama.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1917:** 5–39. *Fig. 1, map* (*colored*), 1920.

4759. O'Neal, A. M. Jr., W. E. Tharp, F. M. Russell, C. E. Watts, and G. H. Artis. **Soil survey, Palo Alto County, Iowa.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–34. *Fig. 1, map* (*colored*). 1921.

4760. Patrick, Austin L., Howard C. Smith, J. M. Snyder, C. C. Engle, L. L. Lee, and H. A. Miller. **Soil survey, Belvidere Area, New Jersey.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1917:** 5–69. *Pl. 1–4, fig. 1, map* (*colored*). 1920.

4761. Perkins, S. O., and W. A. Davis. **Soil survey, Vance County, North Carolina.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–30. *Fig. 1, map* (*colored*). 1921.

4762. Schoenmann, L. R., W. I. Watkins, E. J. Carpenter, William T. Carter, Jr., and M. W. Beck. **Soil survey, Bowie County, Texas.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–58. *Fig. 1, map* (*colored*). 1921.

4763. Smies, E. H., George E. Corson, and Charles J. Meister. **Soil survey, Polk County, Iowa.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–63. *Fig. 1, map* (*colored*). 1921.

4764. Stewart, Robert. **An American source of potash and soil improvement.** Proc. Ann. Meetings Soc. Promotion Agric. Sci. **40/41:** 143–152. 1919/20 [1921].—Results are given of pot cultures with peaty soils treated with finely ground leucite, kainit, finely ground alunite, and ignited alunite to determine the comparative values of these forms of potash for soil improvement. Leucite though not equal to kainit gave sufficient increases in the fields of corn, clover, buckwheat, and rape to justify further investigations. A shale rock from Union County, Illinois, carrying approximately 6 per cent potassium gave a larger increase in yield than any other form of potassium—even larger than kainit or the potassium sulphate from the ignited alunite.—*Lyman Carrier.*

4765. Stewart, Robert. **Sulfur in relation to soil fertility.** Illinois Agric. Exp. Sta. Bull. 227. *99–108.* 1920.—A partial review of the literature on the relation of the sulphur content of plants and soils to crop production is given. As an average of 7 years' determinations, 45.1 pounds of sulphur per acre per year have been carried down in the rainfall at Urbana, Illinois. It is concluded that in its relation to soil fertility, in the humid regions, the sulphur problem is not similar to the phosphorus problem since sulphur is constantly being added to the soil through natural processes.—*O. H. Sears.*

4766. Stroud, J. F., Howard C. Smith, and J. H. Agee. **Soil survey of Shelby County, Alabama.** Advance Sheets Field Operations Bur. Soils. U. S. Dept. Agric. **1917:** 5–58. *Map* (*colored*). 1920.

4767. Sweet, A. T., E. W. Knobel, H. G. Lewis, and W. I. Watkins. **Soil survey of Pike County, Mississippi.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–31. *Pl. 1–5, fig. 1, map* (*colored*). 1921.

4768. Taylor, Arthur E., Grove B. Jones, E. C. Hall, and Charles N. Mooney. **Soil survey of St. Johns County, Florida.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1917:** 5–35. *Pl. 1–3, fig. 1, map (colored).* 1920.

4769. Tharp, W. E., E. H. Smies, and G. W. Musgrave. **Soil survey of Madison County, Mississippi.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1917:** 5–36. *Pl. 1, fig. 1, map (colored).* 1920.

4770. Vanatta, E. S., L. L. Brinkley, and S. F. Davidson. **Soil survey of Orange County, North Carolina.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–47. *Fig. 1, map (colored).* 1921.

4771. Vanatta, E. S., W. B. Cobb, L. L. Brinkley, and S. F. Davidson. **Soil survey, Hoke County, North Carolina.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–29. *Fig. 1, map (colored).* 1921.

4772. Van Duyne, Cornelius, H. C. Mortlock, A. F. Heck, and E. D. Alvord. **Soil survey of Spokane County, Washington.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1917:** 5–104. *Pl. 1–3, fig. 1–5, map (colored).* 1921.

4773. Wallace, T. **Trial cider orchards.** Jour. Bath and West and Southern Counties Soc. **15:** 143–147. 1921.—A report is presented on the chemical analyses of the soils of Monmouthshire.—*J. I. Lauritzen.*

4774. Watkins, W. I., C. E. Deardorff, H. H. Krusekopf, and W. DeYoung. **Soil survey of Chariton County, Missouri.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–33. *Fig. 1, map (colored).* 1921.

4775. Watson, E. B., and J. B. Hammon. **Soil survey of the Grass Valley Area, California.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. **1918:** 5–39. *Pl. 1–3, fig. 1, map (colored).* 1921.

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

E. B. Payson, *Assistant Editor*

(See also in this issue Entries 3284, 3371, 3378, 3396, 3426, 3473, 3525, 3527, 3534, 3577, 3579, 3589, 3593, 3620, 3831, 3832, 3951, 4115, 4142, 4151, 4154, 4209, 4219, 4222, 4223, 4591, 4679)

GENERAL

4776. Anonymous. **Decades Kewenses.** Kew Bull. **1920:** 245–250. 1920.—The contribution contains descriptions of the following new species: *Xanthophyllum Burkilli* Drummond & Dunn, *Impatiens Beccarii* Hook. f., *Ixora Lawsoni* Gamble, *I. monticola* Gamble, *I. Saulierei* Gamble, *Coffea crassifolia* Gamble, *Morinda reticulata* Gamble, *Psychotria Barberi* Gamble, *P. globicephala* Gamble, and *Lasianthus cinereus* Gamble.—*E. Mead Wilcox.*

4777. Anonymous. **Decades Kewenses.** Kew Bull. **1921:** 118–122. 1921.—The following new species are described: *Berberis pseudumbellata* Parker, *Wercklea lutea* Rolfe, *Cotoneaster obovata* Wall., *Spiraea hypoleuca* Dunn, *Ducrosia ovatiloba* Dunn & Williams, *Emilia ramulosa* Gamble, *Ardisia Blatteri* Gamble, *Bassia Bourdillonii* Gamble, *Teucrium Toppinii* Dunn & Williams, and *Dracocephalum glechomifolium* Dunn.—*E. Mead Wilcox.*

4778. Anonymous. **Decades Kewenses.** Kew Bull. **1921:** 216–221. 1921.—The following new species are described: *Biophytum insigne* Gamble, *Rhamnus pentapomica* Parker, *R.*

prostrata Jacquem. ex Parker, *Potentilla sericophylla* Parker, *Tricholepis Toppinnii* Dunn, *Begonia* (*Gireoudia*) *trigonoptera* Sprague, *Symplocos Barberi* Gamble, *Jasminum rex* Dunn, *Celsia Layardii* Ball, and *Aechmea chromatica* Wright.—*E. Mead Wilcox.*

4779. Anonymous. **Decades Kewenses.** Kew Bull. **1921**: 307–312. 1921.—The following new species are described: *Berberis Lamberti* Parker, *Rinorea Hummelii* Sprague, *Gymnosporia Championi* Dunn, *Uraria pulchra* Haines, *Acacia hydaspica* Drumm ex Parker, *Spiraea diversifolia* Dunn, *Rubus almorensis* Dunn, *Jasminum strictum* Haines, *Ervatamia caudata* Gamble, and *Petastoma Broadwayi* Sprague & Riley.—*E. Mead Wilcox.*

4780. Anonymous. [Rev. of: Bews, J. W. **An introduction to the flora of Natal and Zululand.** *vi + 248 p.* City Printing Works: Pietermaritzburg, 1921 (see Bot. Absts. **10**, Entry 802).] Sci. Prog. **16**: 490. 1922.

4781. Brown, N. E. **New plants from tropical and South Africa collected by Archdeacon F. A. Rogers.** Kew Bull. 1921: 289–301. 1921.—The following new species and genus are described: *Ionidium Thorncroftii, Sterculia Rogersii, Triumfetta humilis, T. misella, T. Rogersii, Crotalaria marginata, Indigofera similis, Aeschynomene humulis, A. recta, A. Rogersii, Adenodolichos nanus,* **Alistilus** gen. nov. Leguminosae, *A. bechuanicus, Vernonia fraterna, Sphaeranthus Rogersii, Plectranthus leviculus, Loranthus* (*Acrostachys*) *messinensis, Acalypha multifida, Ficus cognata, Acidanthera holostachya, A. leptostachya, A. lomatensis, Gladiolus nudus, Asparagus longicladus, Drimiopis atropurpurea, Scilla lauta, S. lepida, S. sodalicia, Ornithogallum Longivaginatum Mariscus chersinus, Scirpus confusus,* and *S. Rogersii.*—*E. Mead Wilcox.*

4782. Craib, W. G. **Contributions to the flora of Siam.** Kew Bull. **1920**: 300–305. 1920.—The following new species are described: *Buettneria siamensis, Columbia Winitii, Acer Garrettii, Leea pallida, Viburnum Garrettii, Diospyros similis, D. viridis, D. Collinsae, Symplocos Kerrii, Styrax casearifolia,* and *Stemona Collinsae.*—*E. Mead Wilcox.*

4783. Gamble, J. S. **The flora of Madras: IV.** Kew Bull. **1921**: 312–316. 1921.—Critical notes are given on the treatment of certain species of Rubiaceae to Sapotaceae, including part of Ebenaceae, contained in part 4 of this flora.—*E. Mead Wilcox.*

4784. Haines, H. H. **The botany of Bihar and Orissa. An account of all the known indigenous plants of the province and of the most important or most commonly cultivated exotic ones. Part III. Calyciflorae.** *Small 8 vo. 225–418 p.* Adlard & Son & West Newman: London, 1922.—The groups covered are the Moringaceae to the Cornaceae inclusive, following the Bentham and Hooker system. Descriptions, keys, habitats, economic notes, and local names are given. No new names occur.—*E. D. Merrill.*

4785. Holm, Theo. **Recent botanical publications from the United States National Museum.** Amer. Midland Nat. **7**: 165–180. 1921.—This article contains a brief sketch of early botanical work followed by a criticism of some recent taxonomic contributions from the Smithsonian Institution. The main points of criticism are: (1) The use of common words as substitutes for technical; the writer believes this has been carried so far as to be not only unnatural and non-scientific, but even incorrect in description. (2) The exclusion from the formal list of all plants not represented in the National Herbarium renders it unrepresentative. (3) The use of the American Code of botanical nomenclature.—*Ray C. Friesner.*

4786. House, Homer D. **Nomenclatorial notes on certain American plants. I.** Amer. Midland Nat. **7**: 126–135. 1921.—This article contains a number of new combinations, new species names, and 1 new genus. The following new combinations are proposed: *Botrychium oneidense* (*B. ternatum* var. *oneidense* Gilbert), *Trianthella glutinosa, T. racemosa. Polygonella serotina, Pluchea viscida, Clinopodium arkansanum, Viburnum eradiatum, Agaloma mary-*

landica, *Spondogona salicifolia*, *Minuartia Michauxii*, *Alsine canadensis*, *Orthilia secunda*, *O. elatior*, and *Braxilia minor*. The following new species names are proposed: *Agrostis Peckii*, *Vitis Lecontiana*, *V. Shuttleworthii*, *Agaloma Elliottii*, *Solidago alleghaniensis*, *Solidago salaria*, and *Fragaria Michauxiana*. The generic name **Trianthella** is proposed to replace *Tofieldia* Sect. *Triantha* Nutt., namely, *Triantha* Baker Jour. Linn. Soc. **17:** 490. 1879, not *Trianthus* Hook f.—*Ray C. Friesner.*

4787. Hutchinson, J. **List of plants collected in northern Nigeria by Captain A. W. Hill, 1921.** Kew Bull. 1921: 244–253. 1921.—The following new species are described: *Ochna Hillii*, *Indigofera Dalzielii*, *Dolichos Lelyi*, *Vigna violacea*, *Belonophora Morganae*, *Senecio Cliffordianus*, and *Cycnium petunioides*.—*E. Mead Wilcox.*

4788. Knoche, Herman. **Flora Balearica. Étude phytogéographique sur les Iles Baléares. [Flora of Balearica. Phytographical study of the Balearic Islands.]** *Roy. 8 vo., 534 p., 2 maps.* Roumégous and Déhan: Montpellier, 1921.—This work is based on field studies and extensive collections made during a period of years from 1905 to 1912 inclusive. All the large groups of plants have been included in the study, and certain specialists have cooperated in the work of identification. The present volume is concerned with the natural groups from the Algae to *Adonis* of the Ranunculaceae. There are no keys to the genera and species; and but few descriptions are included. Particular attention has been given to the distribution of vascular plants, graphically indicated by outline maps. Comparatively few new names and new combinations are recorded; these are as follows: *Verrucaria marmorea* Schaer. var. *sphinctrinoides* Bouly de Lesdain n. var., *Ramalina Knochei* Bouly de Lesdain n. sp., *Carex Halleriana* var. *rorulenta* (*C. rorulenta* Porta), *Leucojum aestivum* L. var. *pulchellum* (*L. pulchellum* Salisb.), *Narcissus Tazetta* L. var. *radiatus* (*N. radiatus* Red.), *Crocus minimus* DC. forma *Cambessedesii* (*C. Cambessedesii* J. Gay), *Urtica atrovirens* Req. var. *Bianorii* n. var., *Silene sericea* All. forma *ambigua* (*Silene ambigua* Camb.), *S. sericea* All. var. *apetala* (*S. apetala* Willd.), *S. littorea* Brot. var. *nana* (*S. villosa* var. *nana* Camb.), *Helleborus trifolius* var. *lividus* (*H. lividus* Sol.), *Ranunculus aquatilis* L. var. *parvipetalis* (*R. trichophyllus* Mar. & V., not Chaix.), and *Adonis annua* L. var. *dentata* (*A. dentata* Raffineau-Delile). The collections on which this flora is based are preserved in the Botanical Institute of Montpellier and in the author's personal herbarium.—*J. M. Greenman.*

4789. McAtee, W. L. **Muhlenberg on plants collected in the District of Columbia region about 1809.** Proc. Biol. Soc. Washington **35:** 63–72. 1922.—A list of 224 plants, collected in the District of Columbia by Dr. John Ott and Messrs. Billy and Pickford in 1809, is presented with both Muhlenberg's name and their modern equivalents.—*J. C. Gilman.*

4790. Maiden, J. H. **The forest flora of New South Wales. Vol. VII. Part 9.** *396–425 p., pl. 260–263, 5 photo. illus.* William Applegate Gullick: Sydney, 1921.—Four species are treated in the present part, namely, *Brachychiton discolor* F. v. M., *Eucalyptus Maideni* F. v. M., *Tristania laurina* R. Br., and *Eugenia Moorei* F. v. M. An appendix contains a chapter on Optimum of Timber and one on Experiments on the Strength of Australian Timber. Ibid. Part 10. *426–458 p., pl. 264–267, 5 photo. illus.* 1921.—This part treats the following species: *Eugenia Smithii* Poir., *Eucalyptus Bakeri* Maiden, *E. Smithii* R. T. Baker, and *Codonocarpus cotinifolius* F. v. M. Under the caption of Enemies of Trees the author gives additional notes on this subject. More extensive notes are recorded on pages 209–234 of this work.—*J. M. Greenman.*

4791. Schaffner, J. H. **Additions to the catalog of Ohio vascular plants for 1921.** Ohio Jour. Sci. **22:** 91–94. 1922.—A list of 28 additions made to the Ohio flora during the past year is given. Twenty-one changes of names are indicated for the Scrophulariaceae.—*H. D. Hooker, Jr.*

4792. Sprague, T. A. **Alphabetical list of nomina conservanda (Phanerogamae).** Kew Bull. **1921:** 321–326. 1921.

4793. STEVENS, O. A. **New records and other notes on North Dakota plants.** Bull. Torrey Bot. Club **49:** 93–105. 1922.—Material is presented supplementing Bergman's Flora of North Dakota, and many new records and diagnostic characters are given for plants of that state.—*P. A. Munz.*

4794. THELLUNG, A. **Beiträge zur Adventivflora der Schweiz (III). [Contributions to the adventive flora of Switzerland, III.]** Vierteljahrsschr. Naturforsch. Ges. Zurich **64:** 684–815. 1919.—A large annotated list of species is recorded of nonindigenous Swiss plants, ranging from *Pteris multifida* Poiret to *Crepis pulchra* L.—*John H. Schaffner.*

4795. TURRILL, W. B. **Contributions to the flora of Macedonia: III.** Kew Bull. **1920:** 177–196. 1920.—Notes are given on a collection of over 300 Macedonian plants made by L. V. Turner. *Berteroa incana* L. var. *stricta* (Boiss. & Heldr.) is proposed as a new combination and *Veronica Chamaedrys* var. *rigida* described as a new variety.—*E. Mead Wilcox.*

PTERIDOPHYTES

4796. KOHLER, ERICH. **Farnstudien. [Fern studies.]** Flora **113:** 311–336. *14 fig.* 1920.—This paper has 3 parts. (1) *Aspidium Moorei* and related forms. A study of the soral characters of *Aspidium Moorei* Diels (*Deparia Moorei* Hk.) indicates that in spite of its marginal sorus it is a true *Aspidium* of the section *Deparia.* (2) The genus *Lonchitis.* The species placed by Diels in the genus *Lonchitis* are of 2 types separated by differences in spores, hairs, and crystals. The author recommends placing the 4 species with tetrahedral spores in the group *Laciniata* of the *Eupteris* section of *Pteris,* but he retains the 6 species with bilateral spores in *Lonchitis,* combining it with *Histiopteris* to form the *Histiopterideae.* (3) Apospory and regeneration. The primary leaf of the fern was used as the subject of experimentation in a study of the relation of apospory to sporophytic regeneration.—*A. G. Stokey.*

4797. MAXON, W. R. **Notes on a collection of ferns from the Dominican Republic.** Proc. Biol. Soc. Washington **35:** 47–52. 1922.—Notes on some of the rarer species of ferns collected by Dr. W. L. Abbott in the Dominican Republic, 1920–21, with the description of a well marked new species, *Anemia Abbottii* Maxon, are given herewith.—*J. C. Gilman.*

SPERMATOPHYTES

4798. ANONYMOUS. **New orchids: Decades XLVIII–XLIX.** Kew Bull. **1921:** 52–56. 1921. —The following new species are described by Rolfe: *Microstylis Everardii, M. Imthurnii, M. latisepala, M. longifolia, M. radicicola, Liparis (Coriifolii) vitiensis, Dendrobium (Grastidium) Everardii, D. malaitense, D. (Rhizobium) calamiforme,* and *D. (Speciosa) vitiense.—E. Mead Wilcox.*

4799. ANONYMOUS. **Novitates Africanae.** Ann. Bolus Herb. **3:** 70–85. *Pl. 3, B–D, 4.* 1921.—The following new species are described by L. BOLUS: *Impatiens Duthiae, Dolichos Peglerae, Mesembrianthemum Peacockiae, M. Watermeyeri, Erica plena, E. Eustacei, E. Stokoei, E. Goatcheriana, Klattia Stokoei, Watsonia Pillansii, Tritonia Mathewsiana, Synnotia Metelerkampiae, Gladiolus Blackwellii, Strumaria Watermeyeri, Nerine Frithii, Cyrtanthus Guthrieae, Agapanthus pendulus.* PILLANS has described a number of species of *Restio,* namely, *R. Macowani, R. tabularis, R. similis, R. Marlothii, R. aridus, R. humilis.* The same author makes the following new combinations: *Restio Brownianus* (*Hypolaena? virgata* Mast., *H. Browniana* Mast.), *R. conspicuus* (*Hypolaena conspicua* Mast.), *R. Dodii* (*Hypolaena membranacea* Mast.), *R. Schlechteri* (*Hypolaena Schlechteri* Mast.), *R. cymosus* (*Leptocarpus cymosus* Mast.), and *R. brachiatus* (*Leptocarpus brachiatus* Mast.).—*E. M. Doidge.*

4800. ARTHUR, J. C. **Changes in phanerogamic names.** Torreya **22:** 30. 1922.—New combinations that have arisen in studying rusts are published for the following host-plants: *Jatropha urens* L. is transferred to *Bivonea; Euphorbia cordata* Meyen, *E. clusiaefolia* Hook. &

Arn., and *E. Hookeri* Steud. to *Chamaesyce; Brickellia adenocarpa* Robinson to *Coleosanthus; Gentiana Newberryi* Gray to *Dasystephana; Euphorbia leptocera* Engelm. to *Tithymalus.*—*J. C. Nelson.*

4801. Audas, J. H. **Description of a new Trymalium (N. O. Rhamnaceae) Trymalium ramosissimum nov. sp.** Victorian Nat. 38: 34–35. *Pl. 1.* 1921.—This new plant was discovered at the Grampians (Mount Difficult), Victoria.—*Wm. Randolph Taylor.*

4802. Beccari, Odoardo. **Le palme della Nuova Caledonia. [The palms of New Caledonia.]** Webbia 5: 71–197. *Pl. 1–13.* 1921.—The palms indigenous to New Caledonia are not numerous, but, of the 14 genera found there, only one, *Veitchia*, has foreign representatives. Of the 25 species described 24 belong to the tribe *Areceae.* This article contains considerable descriptive text, a key to the genera, and a key to the species of *Basselinia.* Four new genera are proposed, namely, **Neoveitchia, Rhynchocarpa, Dolicokentia,** and **Clinosperma.** Descriptions of new species and several new combinations are included, as follows: *Veitchia Metiti, V. Hookeriana, Neoveitchia Storckii* (*Veitchia Storckii* H. Wendl.), *Veitchia arecina, Chambeyronia Hookerii, Rhynchocarpa Vieillardi* (*Cyphosperma Vieillardi* H. Wendl.), *Bentnickiopsis ponapensis, Dolicokentia robusta* (*Cyphokentia robusta* Ad. Brongn.), *Brongniartikentia vaginata* (*Cyphokentia vaginata* Ad. Brongn.), *Clinosperma bractealis* (*Cyphokentia bractealis* Ad. Brongn.), *Basselinia heterophylla, B. surculosa* (*Microkentia surculosa* H. Wendl.), *B. tomentosa, B. vellutina, B. glabrata,* and *B. Billardierii* (*Microkentia Billardierii* H. Wendl.).—*John M. Fogg, Jr.*

4803. Beccari, Odoardo. **Recensione delle palme del Vecchio Mondo appartenenti alla tribù delle Corypheae. [Review of Old World palms of the tribe Corypheae.]** Webbia 5: 5–70. 1921.—This review includes 11 genera of the tribe *Corypheae*, contains keys and extensive synonymy, and describes 21 new species and 12 new varieties, as follows: *Corypha microclada, C. Careyana, C. Griffithiana, Nannorhops Stochsiana, N. Naudeniana, Livistona tahanensis, L. decipiens* var. *polyantha, L. Holtzei, L. loriphylla, L. rigida, L. humilis* var. *sclerophylla, L. humilis* var. *novoguineensis, Licuala penduliflora* var. *australis, L. anomala, L. Gjellerupii, L. oninensis, L. leprosa* Dammer, *L. platydactyla, L. petiolulata* var. *kenepajensis, L. acutifida* Mart. var. *peninsularis, L. Ridleyana, L. densiflora, L. ferruginoides, L. reptans, L. spinosa* var. *eriantha, L. merguensis, L. glabra* var. *selangorensis, L. Robinsoniana, L. Wrayi, L. parviflora* Dammer, *L. mattanensis* var. *paucisecta, L. Halleriana, Chamaerops humilis* var. *cerifera, C. humilis* var. *brevisecta.*—*John M. Fogg, Jr.*

4804. Becker, W. **Die Violen der Philippinen. [The violets of the Philippines.]** Philippine Jour. Sci. 19: 707–722. 1921.—Eleven species and several subspecies are recognized as occurring in the Philippines; full descriptions of each are given. New names are *Viola Ramosiana* and *V. Edanoii.*—*E. D. Merrill.*

4805. Bennett, Arthur. **Vaccinium Myrtillus Linn. var. pygmaeus Ostenfeld, f. microphylla Lange, in litt. to Beeby.** Trans. and Proc. Bot. Soc. Edinburgh 28: 75–76. 1921.—A note is recorded on the distribution and characters of this form in Scotland, Orkney, and the Faroe Islands.—*Roxana Stinchfield Ferris.*

4806. Bitter, G. **Eine neue Solanum-Art von den Marianen. [A new species of Solanum from the Marianne Islands.]** Bot. Jahrb. 56: 559–560. 1921.—This is No. 19 of the series, Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. Diels. *Solanum saipanense* is described as new.—*K. M. Wiegand.*

4807. Blake, S. F. **New names for three North American Asteraceae.** Proc. Biol. Soc. Washington 35: 78. 1922.—*Erigeron nevadincola* (*E. nevadense* Gray, not Wedd.), *Erigeron compactus* (*E. pulvinatus* Rydb., not Wedd.), and *Bidens polylepis* (*B. involucrata* (Nutt.) Britton, not Phil.), are given as new names.—*J. C. Gilman.*

4808. Bornmuller, J. **Ein Beitrag zur Kenntnis der Gattung Asyneuma Griseb. [A contribution to the knowledge of the genus Asyneuma Griseb.]** Beih. Bot. Centralbl. II Abt. 38: 333–351. 1921.—Fifty-one species, most of which have been described under *Phyteuma* or *Podanthum*, are assigned to this genus. One of these, *Asyneuma cordifolium* is new. The following species have been transferred to the genus *Asyneuma: Phyteuma amplexicaule* Willd. (*Podanthum amplexicaule* Boiss.), *Podanthum anthericoides* Janka, *Phyteuma argutum* Regel (*Podanthum argutum* O. & A. Fedtsch.), *Phyteuma attenuatum* Franchet (*Podanthum attenuatum* O. & A. Fedtsch.), *Podanthum aurasiacum* Batt. & Trab. (*Campanula aurasiaca* Batt. & Trab.), *Podanthum brachylobum* Boiss., *Phyteuma campanuloides* M. Bieb. (*Podanthum campanuloides* Boiss.), *Phyteuma Cappadocicum* Boiss. (*Podanthum Cappadocicum* Boiss.) *Podanthum cichoriforme* Boiss. (*Phyteuma cichoriforme* Boiss.), *Campanula controversa* Boiss. (*Podanthum controversum* Boiss.), *Podanthum giganteum* Boiss., *P. grandiflorum* Velen., *Phyteuma lanceolatum* Willd. (*Campanula Tauricola* Boiss. & Bal., *Podanthum lanceolatum* Boiss.), *Phyteuma leianthum* Trautv. (*Podanthum leianthum* Boiss.), *Campanula limonifolia* L. (*Phyteuma limonifolium* Sibth. & Sm., *Podanthum limonifolium* Boiss.), *Phyteuma linifolium* Boiss. & Heldr. (*Podanthum linifolium* Boiss.), *Phyteuma lobelioides* Willd. (*Podanthum lobelioides* Boiss., *Phyteuma stylodidoides* Boiss., *Campanula Willdenowii* Boiss.), *Phyteuma Lycium* Boiss. (*Podanthum Lycium* Boiss.), *Podanthum macrodon* Boiss. & Hausskn., *P. obtusifolium* Hausskn. *P. Otites* Boiss., *Campanula persica* A. DC. (*Podanthum persicum* (A.DC.) Boiss.), *Podanthum Psaridis* Held. & Halácy, *Campanula psilostachyum* Boiss. (*Podanthum psilostachyum* Boiss.), *Phyteuma pulchellum* Fisch. & Mey (*Podanthum pulchellum* Boiss.), *Phyteuma Regelii* Trautv. (*Podanthum Regelii* O. & B. Fedtsch., *Phyteuma multicaule* Franchet), *Podanthum scoparium* Boiss. & Hausskn., *Phyteuma Sibthorpianum* Roem. & Schult. (*Podanthum Sibthorpianum* Boiss.), *Podanthum Sintenisii* Hausskn. *Campanula strigillosa* Boiss. (*Podanthum strigillosum* Boiss.), *Podanthum supinum* Wettstein, *Phyteuma tenuifolium* A.DC. (*Podanthum tenuifolium* Boiss.), *Phyteuma Thomsoni* Clarke (*Campanula Thomsonii* Hook. f. & Thoms.), *Phyteuma Trautvetteri*, *Campanula trichocalycina* Ten. (*C. Pichleri* Visiani., *Podanthum trichocalycinum* (Ten.) Boiss.), *Podanthum trichostegium* Boiss., *Campanula virgata* Labill. (*Podanthum virgatum* Boiss.), *Podanthum Woronowii Tomin.—L. Pace.*

4809. Brand, A. **Borraginaceae-Borraginoideae-Cynoglosseae.** Das Pflanzenreich 78. *183 p., 22 fig.* Wilhelm Engelmann: Leipzig, Nov. 22, 1921.—The tribe *Cynoglosseae*, according to the author, includes approximately 225 recognized species, referred to 20 genera, and their main center of distribution is in the region of the Mediterranean Sea. The largest and most widely distributed genus is *Cynoglossum* with 48 species. Eight genera are monotypic. The following new species, varieties, new names, and combinations are recorded: *Trichodesma Droogmansianum* De Wild. & Dur. var. *glabrescens*, *T. angolense*, *T. africanum* R. Br. var. *abyssinicum*, *T. laxiflorum* Balf. f. var. *atrichum*, *T. khasianum* Clarke var. *calcareum*, *T. calathiforme* Hochst. var. *Schimperi*, *T. incanum* A.DC. var. *Griffithii*, *Paracaryum Bungei*, *P. persicum* Boiss. var. *cyclhymenium*, *P. strictum*, *Mattiastrum Lambertianum*, *M. cristatum* Brand var. *Paropamisi*, *M. trinervium*, *M. tibeticum* Brand var. *Schlagintweitii*, *Rindera graeca* Boiss. & Heldr. var. *incana*, *R. Korshinskyi*, *R. tetraspis* Pallas var. *cordifolia*, *Adelocaryum erythraeum*, *Lindelofia cerinthoides* and var. *stenophylla*, *L. kurdica*, *L. Korolkowii*, *L. hissarica*, *L. albida*, *L. lanata* and var. *ovatifolia*, *L. tubiflora*, *L. eriocalycina*, *L. brachystemon*, *L. stylosa* and var. *hispida*, *L. angustifolia*, *L. Olgae*, *L. cynoglossoides*, *Caccinia macranthera* and var. *crassifolia*, *Pectocarya pusilla* var. *flagellaris*, *Omphalodes linifolia* Moench var. *pumila*, *O. sericea* Maxim. var. *koreana*, *O. caucasica*, *Cynoglossum Dioscoridis* Vill. var. *castrilense*, *C. cheirifolium* L. var. *stylosum*, *C. germanicum* Jacq. var. *hungaricum*, *C. montanum* L. vars. *asiaticum*, *alpinum*, *parvifolium*, *latifolium*, and *maroccanum*, *C. creticum* Mill. var. *siculum*, *C. australe* R. Br. var. *Drummondii*, *C. glochidiatum* var. *alpinum*, *C. microglochin* Benth. var. *margananum*, *C. lanceolatum* Forsk. vars. *comoranum* and *Mannii*, *C. coeruleum* Hochst. var. *Winkleri*, and *C. celebicum.—J. M. Greenman.*

4810. Brand, A. **Eine neue Symplocacee von den Palau-Inseln. [A new Symplocaceous plant from the Palau Islands.]** Bot. Jahrb. **56**: 558. 1921.—This is No. 18 of the series, Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. Diels. *Symplocos chabdui* of Palau Island is described as new.—*K. M. Wiegand.*

4811. B[rown], N. E. **Eleocharis Jamesonii.** Kew Bull. 1921: 256. 1921.—The above new combination is made for *Chaetocyperus Jamesonii* described originally by Steudel from Ecuador.—*E. Mead Wilcox.*

4812. Burt-Davy, J. **New or noteworthy South African plants (1).** Kew Bull. **1921:** 49–52. 1921.—The following new species are described: *Indigofera Buchananii*, *Rhynchosia unifoldiata*, *Tephrosia Burchellii*, *Acacia Nebrownii*, *Salacia* (?) *transvaalensis*, *Lannea Kirkii*, all by Burt-Davy. *Ficus Bizanae* is described by Hutchinson and Burt-Davy. The following new varieties are described by Burt-Davy: *Peltophorum africanum* Sond. var. *speciosum*, *Vahlia capensis* Thunb. var. *latifolia*, and *Rhus Gueinzii* Sond. var. *brevifoliata.*—*E. Mead Wilcox.*

4813. Bush, Benjamin Franklin. **Some species of Podosemum.** Amer. Midland Nat. **7:** 29–41. 1921.—Ten species of *Muhlenbergia* are transferred to the genus *Podosemum* Desvaux. The following new combinations are proposed: *Podosemum filipes* (*Muhlenbergia filipes* M. A. Curtis), *P. trichopodes* (*M. trichopodes* (Elliott) Chapm.), *P. pungens* (*M. pungens* Thurber), *P. gracillimum* (*M. gracillima* Torr.), *P. Porteri* (*M. Porteri* Scribner), *P. Reverchoni* (*M. Reverchoni* Vasey & Scribner), *P. affine* (*M. affinis* Trin.), *P. arenicolum* (*M. arenicola* Buckley), and *P. texanum* (*M. texana* Buckley).—*Ray C. Friesner.*

4814. Candolle, C. de. **Piperaceae novae e Micronesia et Polynesia allatae. [New Piperaceae from Micronesia and Polynesia.]** Bot. Jahrb. 56: 502–506. 1921.—This is No. 4 of the series, Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. Diels. The following species are described as new: *Piper ponapense*, *Peperomia pitcairnensis*, *P. Volkensii*, *P. Kraemeri*, *P. breviramula*, *P. yapensis*, *P. Gibbonsii*, *P. ponapensis*, *P. palauensis*, *P. Hoeferi*, *P. saipana*, and *P. nativitatis.*—*K. M. Wiegand.*

4815. Clokey, I. W. **Carex notes.** Amer. Jour. Sci. 3: 88–91. *Pl. 2.* 1922.—The author characterizes and proposes as new *Carex apoda*, based on material collected by Aven Nelson and J. F. Macbride at Mackey, Custer Co., Idaho. Their number 1533, distributed as *Carex atrata* L., is selected as the type, and number 1535, collected at the same locality, is also referred to *Carex apoda*. The article also characterizes and proposes as new *Carex Paysonis*, based upon number 2224, collected by Dr. and Mrs. E. B. Payson on dry rock slides on the eastern slope of Grand Teton, Jackson's Hole, Wyoming.—*T. J. Fitzpatrick.*

4816. Davidson, A. **New species from Southern California.** Bull. Southern California Acad. Sci. **22:** 49–53. 1921.—The following species are described as new: *Allium pseudobulbiferum*, *A. Kessleri*, *A. Marvinii*, *A. monticola*, *Myzorrhiza Hutchinsoniana*, *Lewisia bernardina*, *Ceanothus oblanceolatus*, and *Sedum niveum.*—*Roxana Stinchfield Ferris.*

4817. Diels, L. **Die Myrtaceen Mikronesiens. [The Myrtaceae of Micronesia.]** Bot. Jahrb. **56:** 529–534. 1921.—This is No. 15 of the series, Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. Diels. The paper consists of a list of 15 species with keys and copious notes. The following new names appear: *Myrtella Bennigseniana* (*Leptospermum Bennigsenianum* Volkens), *Decaspermum Raymundi*, *Jossinia palumbis* (*Eugenia palumbis* Merrill), *J. Costenoblei* (*Eugenia Costenoblei* Merrill), *Jambosa stelechantha*, and *Syzygium ponapense.*—*K. M. Wiegand.*

4818. Diels, L. **Eine neue Menispermacee der Palau-Inseln. [A new menispermaceous plant from Palau Island.]** Bot. Jahrb. **56:** 507. 1921.—This is No. 5 of the series, Beiträge zur Flora von Micronesien und Polynesien II, edited by L. Diels. *Pachygone Ledermannii* is described as new.—*K. M. Wiegand.*

4819. Dummer, R. A. **Notes on Acmadenia, B. & W. with a description of one new species and one new variety.** Ann. Bolus Herb. 3: 86–88. 1921.—*Acmadenia barosmoides* Dummer was originally described from material in the British Museum. Specimens in Dr. Marloth's herbarium do not agree with the original description and are described as follows: *Acmadenia Marlothii*, *A. macradenia* (*Adenandra macradenia* Sonder), *A. macradenia* var. *borealis*, and *A. teretifolia* (*Diosma teretifolia* Link).—*E. M. Doidge.*

4820. Engler, A., und K. Krause. **Eine Aracee von Mikronesien. [An araceous plant of Micronesia.]** Bot. Jahrb. 56: 433. 1921.—This is No. 2 of the series, Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. Diels. *Raphidophora palauensis*, from the island of Palau, is described as new.—*K. M. Wiegand.*

4821. Farwell, Oliver Atkins. **Corrections in botanical nomenclature.** Amer. Midland Nat. 8: 33–35. 1922.—*Dilepyrum erectum* is offered as the correct combination with the following synonyms: *Muhlenbergia erecta* Schreb. and *Dilepyrum aristosum* Mx. *Dilepyrum aristosum* Mx. must be considered the type of Michaux's genus rather than *D. minutiflorum* Mx. since the former is more in accord with the generic description. Other new combinations proposed are: *Gardenia virginica* (*Hypericum virginicum* L.), *G. longifolia* (*Triadenum longifolium* Small), and *G. petiolata* (*Hypericum petiolatum* Walt.).—*Ray C. Friesner.*

4822. Farwell, Oliver Atkins. **Mondo, Adans.** Amer. Midland Nat. 7: 41–43. 1921.—The use of the genus *Mondo* Adans., as a synonym for the genus *Carex* is shown to be incorrect. According to Kaempfer, Amoen. Exot. *t. 824*, *Mondo* is a synonym for *Ophiopogon japonicus* Ker-Gawl. "*Mondo* antedates *Ophiopogon* by 44 years and since the latter is not a 'nomen conservanda' it must be displaced by the earlier name." The known species and varieties of *Ophiopogon* are accordingly transferred to the genus *Mondo.*—*Ray C. Friesner.*

4823. Fyson, P. F. **The Indian species of Eriocaulon.** Jour. Indian Bot. 2: 133–150. *13 fig., 1 map;* 192–207. *10 pl., 7 fig.;* 259–266. *13 pl., 2 fig.;* 307–320. *18 pl., 3 fig., 1 map.* 1921. (To be continued).—Difficulty in identifying *Eriocaulon* has led the author to a revision of the Indian species. The only previous work of value is Hooker, in Flora of British India, and Ruhland, in Engler's Das Pflanzenreich. The collections of all important herbaria in India have been examined; these contain duplicates of many of the type sheets. The actual types of all previous species have been deposited in European herbaria, and in many instances could not be traced, so the new species are advanced tentatively. The characters, taxonomic history, and distribution of the genus are discussed. *Eriocaulon* is found all over peninsular India, and in Bengal and the Himalayas, but is absent from drier parts of the Indo-Gangetic Plain. External morphology is dealt with fully, and on the basis of color of anthers, color of bracts, and character, number, and degree of union of the sepals, the genus is divided into 8 sections. The sections are then characterized, and a description, distribution, and critical notes are given for each species. The sections are: (1) *Setaceae*, with 2 recognized Indian species; (2) *Simplices*, with 19 species, of which *E. barba-caprae*, *E. roseum*, and *E. Dianae* are new; (3) *Hirsutae*, with 6 species, *E. Rhodae* being new; (4) *Anisopetalae*, with 6 species; (5) *Scariosae*, with 3 species, *E. Edwardii* new; (6) *Cristatosepalae*, with 8 species, of which *E. Margaretae*, *E. Elenorae*, and *E. Thomasi* are new. (7) *Connatosepalae*, and (8) *Leucantherae* are yet to be described.—*Winfield Dudgeon.*

4824. Gamble, J. S. **Flowering of Arundinaria falcata in the temperate house.** Kew Bull. 1921: 302–306. *Fig. 1–2.* 1921.—A critical comparison is made of *A. falcata* Nees and *A. Falconeri* Gamble, 2 species often confused. Four species are known in the northwestern Himalaya Mountains.—*E. Mead Wilcox.*

4825. Gamble, J. S. **Flowering of Phyllostachys aurea.** Kew Bull. 1920: 217–218. *Fig. 1–7.* 1920.

4826. Gilg, E., und Ch. Benedict. **Die bis jetzt aus Mikronesien und Polynesien bekannt gewordenen Loganiaceen. [The Loganiaceae so far known from Micronesia and Polynesia.]** Bot. Jahrb. 56: 540–557. *Fig. 1–3.* 1921.—This is No. 17 of the series, Beiträge zur Flora Mikronesien und Polynesien II, edited by L. Diels. The paper consists of descriptions and notes on 5 genera and 22 species. The following new species and names are proposed: *Geniostoma Hoeferi*, *G. vitiense*, *G. stenurum*, *Couthovia novocaledonica*, *C. calophylla*, *Fagraea Schlechteri* (*F. grandis* Panch.), *F. samoënsis* (*F. Berteriana* Reinecke), *F. ksid*, *F. vitiensis* (*F. Berteriana* Seemann), *F. salomonensis*, *F. galilai*, and *F. sair*.—*K. M. Wiegand.*

4827. Haines, H. H. **Amoora spectabilis and A. Wallichii.** Kew Bull. **1920**: 238–242. 1920.—The description of *Amoora spectabilis* Miquel, an East Indian tree is revised.—*E. Mead Wilcox.*

4828. Haines, H. H. **Sapindus trifoliata Linn. or S. laurifolia Vahl.** Kew Bull. **1920**: 250–252. 1920.—The author considers *Sapindus laurifolia* a synonym of *S. trifoliata*.—*E. Mead Wilcox.*

4829. Harms, H. **Die Araliacea Papuasiens. [The Araliaceae of Papuasia.]** Bot. Jahrb. 56: 374–400. *Fig. 1–4.* 1920; 401–414. 1921.—Eighty-five species are found in Papuasia of which 78 are endemic. Forty-five or more of the endemic species belong to the large pantropical genus *Schefflera*. Especially many belong to *Schefflera* § *Pseudobrassaiae* with numerous stamens and carpels, an unlobed, thick, cap-like corolla, and flower-heads in long panicles. There are many monotypic genera. Most of the species are in the mountains at altitudes of 500–2000 m. Coriaceous leaved species occur at the upper altitudes. Slender trees of medium height are rare. Forms are more common with terminal rosettes of leaves and few or candelabra-like branches. Epiphytes and lianes are not rare. Some species are noticeably small, others quite large; palmately compound leaves are general, while simple leaves are very rare. The moss-like covering of hair on the young parts of many species of *Schefflera* is peculiar in contrast with the silky covering of similar parts in South American Araliaceae, thus showing a different evolutionary tendency in the group in different countries. The species are treated under 13 genera with keys. The following species are described as new: *Boerlagiodendron micranthum*, *B. Sayeri*, *B. stenolobum*, *B. Ledermanii*, *Schefflera megalantha*, *S. Pullei*, *S. corallinocarpa*, *S. pseudobrassaia*, *S. stenopetala*, *S. eriocephala*, *S. polyastra*, *S. setulosa*, *S. Stolleana*, *S. Schraderiana*, *S. Rudolfi*, *S. leiophylla*, *S. Janowskyi*, *S. stenophylla*, *S. oligodon*, *S. Schultzei*, *S. pagiophylla*, *S. scytinophylla*, and *S. kajonensis*. In the portion of the paper appearing in 1921 the following new species were proposed: *Schefflera tanytricha*, *S. stenoura*, *S. Caroli*, *S. kaniensis*, *S. Lorentzii*, *S. microgyne*, *S. Hellwigiana*, *S. tanyrhachis*, *S. Hunsteiniana*, *S. sepikiana*, *S. Gjellerupii*, *Polyscias Ledermannii*, *P. Schultzei*, *P. Gjellerupii*, *P. Caroli*, and *P. Roemeriana*.—*K. M. Wiegand.*

4830. Hauman, Lucien. **Notes sur le genre Chloraea Lindley. [Notes on the genus Chlorea.]** Mem. Acad. Roy. Belgique Ser. II 6: *31 p., 5 fig., map.* 1921.—This genus of terrestrial orchids the author regards as occupying a place in the flora of South America similar to the European *Orchis* in the northern hemisphere. By means of a map he shows its curious discontinuous distribution over 3 areas 500 to 1000 km. apart. These areas are (1) the Patagonio-Chilian, from Valpariso to Terra del Fuego, with some 60 species, (2) the Rio de la Plata-Brazilian, in south eastern Brazil and adjacent Argentina, with 3 or 4 species; and (3) the Tucumano-Bolivian, on the eastern slopes of the Andes in northern Argentina and southern Bolivia, with about 12 species. A key is given for a section of the genus termed *Foliosae* and a review of the Argentine species. This includes the description of 4 new species: *Chloraea bella*, *C. subpandurata*, *C. laxiflora*, and *C. Castillonii*.—*Geo. D. Fuller.*

4831. Hauman, Lucien. **Orchidees argentines (deuxieme serie). [Argentine orchids.]** An. Soc. Cien. Argentina **90**: 95–154. *Fig. 15.* 1921.—This is a list with notes on distribution and taxonomy of all species of orchids known to occur in Argentina. Among the most abundant are *Habenaria*, 5 spp., *Chloraea*, 20 spp., *Asarca*, 6 spp., *Spiranthes*, 15 spp., and *Aa* with 3 spp. In all 92 species are listed and of these *Asarca enigmatica*, *Stenorrynchus Castillonii*, *S. secundiflorus*, *Stenoptera aspidistrifolia*, and *Pleurothallis Bertoniensis* are new species.—*Geo. D. Fuller.*

4832. Hill, A. W. **Thesium brachystylum.** Kew Bull. **1920**: 176. 1920.—This plant is described as a new species from South Africa.—*E. Mead Wilcox.*

4833. Hitchcock, A. S. **Grasses of British Guiana.** Contrib. U. S. Nation. Herb. **22**: 439–515. *Pl. 53, fig. 77–86.* 1922.—An introduction, containing an account of the material examined and lists of the species characteristic of the various habitats, is followed by a list of the 169 species of grasses recorded from British Guiana. In a note at the end of the paper 2 additional species are listed. Keys are given to the series, tribes, genera, and species, and under each species a brief diagnosis is given, accompanied by its synonymy, general range, and the citation of specimens from British Guiana. The following new names by the author, except as otherwise indicated, occur: *Eragrostis guianensis*, *Triodia flaccida* (Doell), *Syntherisma malacophylla*, *S. cuyabensis* (Trin.), *S. chinensis* (Nees), *Axonopus leptostachyus* (Flügge), *A. scoparius* (Flügge), *A. attenuatus* (Presl), *A. stragulus* Chase, *Paspalum orbiculatum potarense* Chase, *P. Abrahami* Chase, *Panicum luticola*, *P. guianense*, *P. asperifolium* (Desv.), *P. magnum*, *P. errabundum*, *Raddia Malmeana* (Ekman), *Manisuris guianensis*, *Pariana Gleasoni*. Two maps of British Guiana are given, and all but 1 of the new species are illustrated by full-page habit figures.—*S. F. Blake.*

4834. Holm, T. **Studies in the Cyperaceae.** Amer. Jour. Sci. **2**: 285–294. *8 fig.* 1921.—The author considers in general and in particular *Carex crinita* Lam., *C. gynandra* Schw., and *C. maritima* Muell. of the section *Crinitae* nob.; also *C. aperta* Boott and *C. pruinosa* Boott of the section *Apertae* nob.; and *C. magnifica* Dewey, *C. Schottii* Dewey, and *C. lacunarum* nob. of the section *Magnificae* nob.—*T. J. Fitzpatrick.*

4835. Holm, T. **Studies in the Cyperaceae.** Amer. Jour. Sci. **2**: 322–329. *11 fig.* 1921.—A short note is given on the characters of the section *Phacotae* nob., which includes the species *Carex phacota* Spreng., *C. incisa* Boott, *C. cernua* Boott, *C. praelonga* Clarke, *C. Prescottiana* Boott, and *C. kiotensis* F. & S., natives of southern and eastern Asia. The paper also gives a full account of the species of the section *Tennariae* nob., containing *Carex ternaria* Forst. and *C. subdola* Boott, both of New Zealand, *C. tuminensis* Kom. of Korea, *C. Arnottiana* Nees of Ceylon, and *C. Darwinii* Boott of southern and western South America.—*T. J. Fitzpatrick.*

4836. Holm, T. **Studies in the Cyperaceae.** Amer. Jour. Sci. **3**: 138–144. *12 fig.* 1922.—The author characterizes, delimits, and annotates *Carex macrochaeta* Mey., *C. flavocuspis* F. & S., *C. gansuensis* Franch., and *C. scita* Maxim. of the natural section *Macrochaetae* nob. A discussion of *C. nesophila* nob. of the section *Nesophilae* nob. is included.—*T. J. Fitzpatrick.*

4837. Holm, T. **Studies in Cyperaceae.** Amer. Jour. Sci. **3**: 260–268. *14 fig.* 1922.—The author characterizes and annotates *Carex glaucescens* Ell. of the monotypic section *Glaucescentes* nob. The species ranges from Virginia to Missouri, south to Florida. In a similar manner is treated the section *Limosae* nob. which includes the species *Carex littoralis* Schw., *C. limosa* L., *C. laxa* Wahlenb., *C. rariflora* Sm., *C. stygia* Fr., and *C. magellanica* Lam.—*T. J. Fitzpatrick.*

4838. House, Homer D. **Nomenclatorial notes on certain American plants. II.** Amer. Midland Nat. 8: 61–64. 1922.—A list is given of a number of genera that should be credited to Miller. The *Cunila* (L.) of Britton is not the same as the *Cunila* of Linnaeus, but is *Sideritis romana* L. (1753). The *Cunila* of Linnaeus, *C. mariana* L. (1759), *C. origanoides* (L.) Britton, is variously referred to as *Hedyosmus* Mitchell (1748) and *Mappia* Heist.; Adans. (1763) and now becomes *Mappia origanoides* (L.) comb. nov. *Mappia* Jacq. (1797) has been recognized as a valid genus of the Olacaceae. For this genus *Leretia* Vell. (1825) is substituted with *L. angustifolia* (Griseb.) and *L. racemosa* (Jacq.) as new combinations. *Capnorchis* (Boerh.) Miller (1754) is substituted for *Bicuculla* Adans. (1763) and *Capnorchis occidentalis* (Rydb.) is a new combination. A number of species of *Paullinia* and of *Serjania* are given as new combinations in the genus *Cururu* (Plum.) Miller. *Polygonum Uvifera* L., *Coccoloba laurifolia* Jacq., and *C. venosa* L. are placed as new combinations in the genus *Guaibara* (Plum.) Miller.—*Ray C. Friesner.*

4839. Hutchinson, J. **Bocconia and Macleaya.** Kew Bull. 1920: 275–282. *Illus.* 1920. —The following new species are described: *Bocconia glaucifolia, B. gracilis, B. Pearcei,* and *B. pubibractea.*—*E. Mead Wilcox.*

4840. Hutchinson, J. **Jeffersonia and Plagiorhegma.** Kew Bull. 1920: 242–245. 1920. —Taxonomic notes are given and a comparison is made of the floras of northeastern Asia and Atlantic North America with special reference to the occurrence of species of Berberidaceae.—*E. Mead Wilcox.*

4841. H[utchinson], J. **Polypodiopsis.** Kew Bull. 1920: 372. 1920.—*Polypodiopsis Muellerii* Carrière is believed to be the same as *Bauprea Balansae* Brongn. & Gris, a species of Proteaceae found in New Caledonia.—*E. Mead Wilcox.*

4842. Hutchinson, J. **The family Winteraceae.** Kew Bull. 1921: 185–191. *Illus.* 1921. —The present family is maintained as distinct from Magnoliaceae. There is suggested a new order Magnoliales to contain the following families: Cercidiphyllaceae, Lactoridaceae, Himantandraceae, Magnoliaceae, Schizandraceae, Trochodendraceae, and Winteraceae. There are also notes included on the geographical distribution, economic products, literature, and a key to the following 7 genera of Winteraceae: *Bubbia, Belliolum, Drimys, Exospermum, Illicium, Wintera,* and *Zygogynum.*—*E. Mead Wilcox.*

4843. Hutchinson, J. **The genera of Fumariaceae and their distribution.** Kew Bull. 1921: 97–115. *Illus.* 1921.—Keys are given to the 18 recognized genera together with maps showing their geographical distribution. *Discocapnos Dregei* is described as a new species. The following new combinations are published: *Dactylicapnos Macrocapnos, D. Roylei, D. scandens, D. torulosa,* and *Phacocapnos Burmannii.*—*E. Mead Wilcox.*

4844. Hutchinson, J. **The genus Therorhodion.** Kew Bull. 1921: 201–205. *Fig. 1.* 1921. —A taxonomic and ecologic account is given of the genus *Therorhodion* and its 3 species, *T. camtschaticum* Small, *T. glandulosum* Standley, and *T. Redowskianum* (Maxim.) Hutchinson comb. nov. These are segregates from *Rhododendron*, formerly included by Maximowicz in his section *Therorhodion.*—*E. Mead Wilcox.*

4845. Jumelle, H. **Le genre Sclerocarya à Madagascar. [The genus Sclerocarya in Madagascar.]** Rev. Gén. Bot. 33: 753–757. 1921.—The 2 species of *Sclerocarya* known to Madagascar, *S. caffra* Sond. and *S. minor* (*Shakua minor* Boj.) are described and compared.—*J. C. Gilman.*

4846. Krause, K. **Revision der Gattung Androcymbium Willd. [Revision of the genus Androcymbium Willd.]** Notizbl. Bot. Gart. Berlin 7: 512–526. 1921.—Thirty species are recognized and keyed, all from South Africa. *A. Schlechteri* Krause, *A. ciliolatum, A. scabromarginatum, A. fenestratum, A. irroratum, A. guttatum, A. pulchrum,* and *A. bellum* Schlechter & Krause are described as new.—*H. A. Gleason.*

4847. Kükenthal, G. **Die Cyperaceen der Ule'schen Amazonas-Expedition. [The Cyperaceae of Ule's expedition to the Amazon.]** Bot. Jahrb. 56: Beiblatt 125: 13–25. Jan. 1921.—The paper is comprised of a long list of species, with notes on occurrence, range, and synonymy, under 16 genera. The following species are described as new: *Bulbostylis stenocarpa*, *Rhynchospora albo-marginata*, *R. Uleana*, *R. immensa*, *R. elegans*, *R. Roraimae*, *Scleria valdemuricata*, *S. latilacunosa*, *S. retroserrata*, *S. peruviana*, *S. longigluma*. The following new varieties are proposed: *Rhynchospora junciformis* Boeck. var. *monocarpa*, *Diplacrum longifolium* Clarke vars. *angustifolium* and *laevissimum*, *Calyptrocarya monocephala* Hochst. var. *triceps*.—*K. M. Wiegand.*

4848. Lauterbach, C. **Die Anacardiaceen Mikronesiens. [The Anacardiaceae of Micronesia.]** Bot. Jahrb. **56**: 516–521. *Fig. 1.* 1921.—This is No. 10 of the series, Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. Diels. Of this family there are 7 genera and 10 species known from Micronesia, of which the following are introduced and cultivated apparently for their edible fruit: *Anacardium occidentale* L., *Mangifera minor* Bl., *Spondias dulcis* Forst., and *S. mangifera* Willd. Four species are endemic. The sap of *Semecarpus venenosa* Vlks. and *S. Kraemeri* Laut. is poisonous. Keys and copious notes are given. The following species and variety are described as new: *Buchanania palawensis*, *Campnosperma brevipetiolata* Vlks. var. *parvifolia*.—*K. M. Wiegand.*

4849. Lauterbach, C. **Die Burseraceen Mikronesiens. [The Burseraceae of Micronesia.]** Bot. Jahrb. **56**: 515. 1921.—This is No. 9 of the series, Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. Diels. Two species are listed and discussed; one, *Canarium commune* L., is introduced and the other, *C. palawense*, is endemic and new to science.—*K. M. Wiegand.*

4850. Lauterbach, C. **Die Rutaceen Mikronesiens. [The Rutaceae of Micronesia.]** Bot. Jahrb. **56**: 508–512. 1921.—This is No. 7 of the series, Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. Diels. Seven species in 5 genera are listed and discussed. Of these the following are new: *Evodia palawensis*, *E. trichantha*, *E. nitida*, and *Melicope ponapensis*.—*K. M. Wiegand.*

4851. Loesener, Th. **Eine Aquifoliacee Mikronesiens. [A Micronesian aquifoliaceous plant.]** Bot. Jahrb. **56**: 522–523. 1921.—This is No. 11 of the series, Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. Diels. The family was not previously known in this region. The present species is a typical *Euilex* of the section *Microdontae*, which is the most extensive and widespread section in the Old and New World. The nearest relatives are in Formosa, the Philippines, and Hongkong. The plant is named *Ilex Mertensii* Maxim. var. *Volkensiana* n. var.—*K. M. Wiegand.*

4852. Lonay, H. **Sur quelques genres rares ou critiques des Renonculacées. [Concerning some rare or critical genera of the Ranunculaceae.]** Arch. Inst. Bot. Univ. Liége **5**: *14 p.* 1914 [1920].—The author has cultivated *Trautvetteria palmata* Fisch. & Mey., *Callianthemum rutaefolium* C. C. Mey., *C. Kernerianum* Freyn., *Coptis trifolia* Salisb., *C. brachypetala* S. & Z., and *Xanthorrhiza apiifolia* L. Hérit. He proposes the union into a single genus of the genera *Trautvetteria* and *Oxygraphis*. In maintaining the latter genus it may be allowed 2 sections: section I, *Callianthemum;* section II, *Trautvetteria*. The genus *Xanthorrhiza* should be united to the genus *Aquilegia*. The genus *Coptis* should not be united to the genus *Isopyrum*.—*Henri Micheels.*

4853. Maiden, J. H. **A critical revision of the genus Eucalyptus.** Vol. V, Part 7. *Pp. 187–223, pl. 192–195.* William Applegate Gullick: Sydney. July, 1921.—The present part contains descriptions, synonymy, notes, and illustrations of the following species: *Eucalyptus Laseroni* Baker, *E. De Beuzevillei* Maiden, *E. Mitchelli* Cambage, *E. Brownii* Maiden & Cambage, *E. Cambageana* Maiden, *C. miniata* A. Cunn., *E. Woollsiana* Baker, *E. odorata* Behr & Schlecht., *E. hemiphloia* F. v. M. var. *microcarpa* Maiden, *E. bicolor* A. Cunn., *E. pilligaensis* Maiden, *E. penrithensis* Maiden, *E. micranthera* F. v. M., *E. notabilis* Maiden, and *E. canaliculata* Maiden.—Ibid. Part 8. *Pp. 224–260, pl. 196–199.* August, 1921.—This part continues the work with a similar treatment of *E. paniculata* Sm., *E. decorticans* Maiden sp. nov., *E. Culleni* Cambage, *E. Beyeri* Baker, *E. globulus* Labill., and *E. nova-anglica* Deane & Maiden.—Ibid. Part 9. *Pp. 261–290, pl. 200–203.* 1921.—The present part contains descriptions, synonymy, notes, and illustrations of the following species: *Eucalyptus drepanophylla* F. v. M., *E. leptophleba* F. v. M., *E. Dalrympleana* Maiden, E. *dichromophloia* F. v. M., and *E. Hillii* Maiden.—*J. M. Greenman.*

4854. Maiden, J. H. **A critical revision of the genus Eucalyptus.** Vol. V. Part 10. *Pp. 291–332, pl. 204–207.* William Applegate Gullick: Sydney, 1921.—The following species are described and illustrated in this part: *Eucalyptus Houseana* (Fitzgerald) Maiden, *E. Jutsoni* Maiden, *E. adjuncta* Maiden, *E. pilularis* Sm., *E. pumila* Cambage, *E. rariflora* F. M. Bailey, and *E. mundijongensis* Maiden. The author also introduces a discussion of the bark of *Eucalyptus.* Ibid. Vol. VI. Part 1. *Pp. 1–60, pl. 208–211.* February, 1922.—Nine species are elaborated in this part, namely: *Eucalyptus Sheathiana* Maiden, *E. striaticalyx* Fitzgerald, *E. taeniola* Baker & Smith, *E. Stricklandi* Maiden, *E. unialata* Baker & Smith, *E. Planchoniana* F. v. M., *E. margianata* Sm., *E. Irbyi* Baker & Smith, and *E. yarraensis* Maiden & Cambage n. sp. Several pages are devoted to a continuation of a discussion of *Eucalyptus* bark.—*J. M. Greenman.*

4855. Mattfeld, Joh. **Enumeratio specierum generis Minuartia (L.) emend. Hiern.** Bot. Jahrb. 57: Beiblatt 126: 27–33. 1922.—The author has completed his revision of the genus, but since the special part of the text of his revision in which species are critically treated cannot appear, he has presented the section groups and lists of species in the present paper. The following new combinations are made: *Minuartia Douglasii* (*Alsine Douglasii* Fenzl.), *M. Howellii* (*Arenaria Howellii* Wats.), *M. moehringioides* (*Hymenella moehringioides* Moç. & Sessé), *M. uniflora* (*Stellaria uniflora* Walt.), *M. patula* (*Arenaria patula* Michx.), *M. Nuttallii* (*Stellaria Nuttallii* Torr. & Gray), *M. glabra* (*Arenaria glabra* Michx.), *M. brevifolia* (*Arenaria brevifolia* Nutt.), *M. caroliniana* (*Arenaria caroliniana* Walt.), *M. Michauxii* (*Alsine Michauxii* Fenzl.), *M. pungens* (*Arenaria pungens* Nutt.), *M. californica* (*Arenaria brevifolia* var. *californica* Gray), *M. pusilla* (*Arenaria pusilla* Wats.), *M. acutiflora* (*Alsine acutiflora* Fenzl.), *M. tenella* (*Arenaria tenella* Nutt.), *M. Regeliana* (*Alsine tenuifolia* var. *Regeliana* Trautv.), *M. hamata* (*Scleranthus hamatus* Hauskn.), *M. urumiensis* (*Alsine urumiensis* Bornm.), *M. leucocephala* (*Alsine leucocephala* Boiss.), *M. leucocephaloides* (*Alsine leucocephaloides* Bornm.), *M. Pestalozzae* (*Alsine Pestalozzae* Boiss.), *M. lanceolata* (*Arenaria lanceolata* All.), *M. Kashmirica* (*Arenaria Kashmirica* Edgew.), *M. rimarum* (*Alsine rimarum* Boiss. & Bal.), *M. Heldreichiana* (*Alsine Heldreichiana* Boiss.), *M. pontica* (*Alsine pontica* Bornm.), *M. Garckeana* (*Alsine Garckeana* Aschers. & Sint.), *M. laricina* (*Spergula laricina* L.), *M. imbricata* (*Arenaria imbricata* M. a. B.), *M. obtusa* (*Arenaria obtusa* Torr.), *M. formosa* (*Alsine formosa* Fenzl.). New subspecies and names are: *M. Saxifraga* (Friv.) A. & G. subsp. *rumelica* (*Arenaria Saxifraga* Friv.), *M. Saxifraga* subsp. *tmolea* (*Alsine Saxifraga* Boiss.), *M. stereoneura* (*Alsine setacea* var. *corymbulosa* Batt. & Trab., not Boiss.). Several other new species and many subspecies are proposed, but since they are without descriptions or citations of previous descriptions they have no nomenclatorial standing.—*K. M. Wiegand.*

4856. Mez, C. **Die Myrsinaceen Mikronesiens. [The Myrsinaceae of Micronesia.]** Bot. Jahrb. 56: 535–539. 1921.—This is No. 16 of the series, Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. Diels. The paper consists of a list of 8 species with descriptions and notes. The following species are described as new: *Maesa carolinensis, M. palauensis, Discocalyx ponapensis, D. macrophylla, Embelia palauensis, Rapanea carolinensis, R. Ledermanni,* and *R. palauensis.*—*K. M. Wiegand.*

4857. Mez, Carl. **Gramineae africanae. XIV. (Nonnulus arabicis inclusis.) [African Gramineae. XIV (including some from Arabia).]** Bot. Jahrb. 57: 185–201. 1921.—In this article 94 new species of grasses from various portions of Africa and Arabia are described, as follows: *Panicum scabrifolium,* Madagascar; *P. comorense,* Kamerun, East Africa; *P. isolepis,* West Africa and Congo; *P. chionachne*, North Nyassaland; *P. Eickii*, Usambara; *P. melanospermum*, Southwest Africa; *P. praelongum*, Sudan; *P. simbense*, East Africa; *P. frutescens*, Arabia and Somaliland; *P. lacteum*, Madagascar; *P. capense*, Cape Colony; *P. lanipes*, South Africa; *P. adenense*, Arabia; *P. crassipes*, S. W. Africa; *P. leprosulum*, Comoro; *P. Voeltzkowii*, Madagascar; *P. kalaharense*, S. W. Africa; *P. arbusculum*, S. W. Africa; *P. globulosum*, West Africa; *P. verruciferum*, Nyassaland; *P. afrum*, Kamerun; *P. Klingii*, Togoland; *P. purpurascens*, East Africa; *P. Sparmanni*, Senegambia; *P. radicosum*, French Sudan; *P. kermesinum*, Adamawa; *P. Boivini*, Comoro; *P. mokaënse*, Fernando-Po; *P. madipirense*, East Africa; *P. radula*, S. W. Africa, East Africa; *P. scandens*, Liberia; *P. Dinklagei*, Liberia; *P. cinereoviride*, Adamawa; *Pennisetum exiguum*, Madagascar; *P. Rangei*, S. W. Africa; *P. Stolzii*, North Nyassaland; *P. validum*, North Nyassaland; *P. togoënse*, Togoland; *P. Ledermanni*, Kamerum; *Digitaria melinioides*, South Nyassaland; *D. Stolzii*, North Nyassaland; *D. Poggeana*, Congo; *D. lomanensis*, Congo; *D. nyssana*, South Nyassaland; *D. Buchananii*, South Nyassaland; *D. alba*, Central Africa; *D. elegantula*, East Africa; *D. Lecardii*, Senegambia, Nigeria; *D. Merkeri*, East Africa; *D. Eichingeri*, East Africa; *D. usambarica*, Usambara; *D. Antunesii*, Angola; *D. hiascens*, Cape Colony; *D. Richardsonii*, Nigeria; *D. brevipes*, East Africa; *D. kilimandscharica*, East Africa; *D. Endlichii*, Kilimanjaro; *Sacciolepis circumciliata*, East Africa; *S. incana*, Rhodesia; *S. barbiglandularis*, North Nyassaland; *Urochloa Quintasii*, Sofala grassland and German East Africa; *Melinis otaviensis*, S. W. Africa; *M. Rangei*, S. W. Africa; *M. Seineri*, S. W. Africa; *M. Bertlingii*, S. W. Africa; *M. ejubata*, S. W. Africa; *M. Barbeyana*, Arabia; *M. pulchra*, S. W. Africa; *M. affinis*, S. W. Africa; *M. chaetophora*, Angola; *M. secunda*, S. W. Africa; *M. congesta*, Angola; *M. argentea*, Adamawa; *M. mutica*, S. W. Africa; *M. subglabra*, North Nyassaland; *M. nigricans*, Huilla; *M. ascendens*, Huilla; *M. Goetzenii*, Central Africa; *M. Bachmannii*, Pondoland; *M. Munzneri*, North Nyassaland; *M. nitens*, Kilimanjaro; *M. brachyrhynchus*, Kamerun; *M. Stolzii*, North Nyassaland; *M. paupera*, East Africa; *M. Merkeri*, East Africa; *M. villosipes*, South Nyassaland; *M. nyassana*, North Nyassaland; *M. ugandensis*, East Africa; *M. somalensis*, Northeast Africa and southwest Asia; *M. Eichingeri*, East Africa; *M. trichotoma*, S. W. Africa; *M. denudata*, Huilla; *M. diminuta*, North Nyassaland; *M. hirsuta*, S. W. Africa.—*K. M. Wiegand.*

4858. Mez, Carl. **Neue Gramineen.** [**New grasses.**] Bot. Jahrb. **56**: Beiblatt **125**: 1–12. Jan. 1921.—The following species are described as new: *Panicum turfosum*, Paraguay; *P. Lorentzianum*, Argentina; *P. Schwackeanum*, French Guiana; *P. Warmingii*, Brazil; *P. unilineatum*, Argentina; *P. Villaricense*, Paraguay; *P. mucronulatum*, Brazil; *P. Albertense*, Australia; *P. mirabile*, Brazil; *P. albidum*, Cochinchina; *P. saigonense*, Cochinchina; *P. flavo-marginatum*, Paraguay; *P. exiguum*, Brazil; *P. Bernoullianum.* Guatemala; *P. ecuadorense*, Ecuador; *P. myrianthum*, Guiana; *P. Prieurii*, Guiana; *P. Grisebachianum*, Cuba; *P. Schaffneri*, Mexico; *P. Schiedeanum*, Mexico, Guatemala; *P. januarium*, Brazil, Paraguay; *P. blepharophorum*, Brazil; *P. goyazense*, Brazil; *P. validum*, Argentina; *P. Pavonii*, Peru; *P. egregium*, Island of Nossibé; *P. sandiense*, Peru; *P. Berteronianum*, Haiti, Venezuela, Brazil; *P. Andreanum*, Colombia; *P. Braunii*, Bismark Archipelago; *P. papuanum*, Waighiou Island; *P. l'Herminieri*, Guadeloupe; *P. melanogonum*, Martinique; *Olyra podachne*, Brazil; *O. Kegelii*, Dutch Guiana; *O. speciosa*, Guiana; *Pennisetum annuum*, Peru; *P. pilcomayense*, Paraguay; *Digitaria divulsa*, Farther India; *D. megapotamica*, Paraguay; *D. fluminensis*, Brazil; *D. curvipes*, Australia; *D. singularis*, Paraguay; *D. Doellii*, Brazil; *D. laetevirens*, Argentina; *D. eriostachya*, Paraguay; *Mesosetum discolor*, Brazil; *M. elongatum*, Brazil; *Ichnanthus Lützelburgii*, Brazil; *I. Zehntneri*, Brazil; *Paspalum sincoranum*, Brazil; *P. echinotrichum*, Hylaea; *P. flexile*, Brazil; *P. Purpusii*, Mexico; *P. iridaceum*, Paraguay; *P. gregoriense*, Peru; *P. caulescens*, Guiana; *P. Wullschlägelii*, Guiana; *P. ciliocinctum*, Brazil; *P. polychaetum*, Guiana; *P. parinervium*, Brazil; *P. tenacissimum*, Porto Rico; *P. arundinellum*, Paraguay, Brazil; *Anthaenatiopsis Fiebrigii*, Paraguay; *Eriochloa Weberbaurei*, Peru; *E. pacifica*, Ecuador, Peru, Australia; *E. texana*, Texas; *E. peruviana*, Peru; *E. debilis*, Florida. The following new combinations are proposed: *P. nudiculme* (*Triscenia ovina* Griseb., Cuba), *P. Doelli* (*P. minutiflorum* Doell, Brazil, Paraguay).—*K. M. Wiegand.*

4859. Millais, J. G. **The true forms of Rhododendron campylocarpum and Rhododendron Wightii.** Rhododendron Soc. Notes **2**: 73–75. 1921 [1922].—The author describes the typical forms of the 2 species and distinguishes the following new varieties: *Rhododendron campylocarpum* var. *pallidum* and *R. Wightii* var. *minor.—Alfred Rehder.*

4860. Piper, C. V. **The identification of Berberis aquifolium and Berberis repens.** Contrib. U. S. Nation. Herb. **20**: 437–451. *Pl. 24–26.* 1922.—The precise identity of *Berberis aquifolium* Pursh, one of a group of closely related west-American species, has long been involved in doubt. On the basis of the original material collected on the Lewis and Clark Expedition and now preserved in the Philadelphia Academy of Natural Sciences, the name *B. aquifolium* is retained for the shiny-leaved, usually tall species of the northwest coast, while the lower plant of more eastern and southern range is identified with *Berberis repens* Lindl. A critical discussion of the history and diagnostic characters of *B. aquifolium* is given, illustrated by photographs of the type specimen.—*S. F. Blake.*

4861. Prescott, E. E. **Notes on the orchids of Victoria.** Victorian Nat. **37**: 109–114. *2 pl.* 1921.—This paper gives notes upon 30 species reported since 1911 and refers to earlier papers.—*Wm. Randolph Taylor.*

4862. Rehder, Alfred. **New species, varieties and combinations from the herbarium and the collections of the Arnold Arboretum.** Jour. Arnold Arboretum **3**: 11-51. 1921 [1922].—This article deals chiefly with Rosaceae and Leguminosae and contains the following new combinations, new species, varieties, and hybrids: × *Rosa Barbierana*, × *R. Paulii*, × *R. Paulii* f. *rosea*, × *R. Bruantii*, × *R. anemonoides*, × *R. dilecta*, *R. Richardii*, × *R. Waitziana* var. *macrantha*, *R. virginiana* var. *lamprophylla*, *R. carolina* var. *glandulosa* (Crép.), *R. Lyonii* f. *alba* (Rehd.), *R. suffulta* f. *alba* (Rehd.), *R. californica* f. *plena*, × *R. Penzanceana*, × *Prunus Dunbarii*, *P. mume* var. *tonsa*, *P. mume* f. *alba* (Carr.), *P. mume* f. *Alphandii* (Carr.), *P. kansuensis*, *P. Persica* f. *duplex* (Weston), *P. Persica* var. *nucipersica* f. *aganonucipersica* and f. *scleronucipersica* (Schuebl. & Mart.), × *P. amygdalo-persica* (Weston), *P. argentea* (Lam.), *P. japonica* var. *fukienensis*, *P. japonica* var. *Nakaii* (Lév.), *P. triloba* f. *normalis*, *P. mahaleb* f. *xanthocarpa* (Roem.), *Sophora japonica* var. *vestita*, *Cytisus scoparius* f. *plenus* and f. *erniensis* (A. Cheval.), *C. albus* var. *microphyllus* (Boiss.), *C. albus* var. *pallidus* (Schrad.), × *Wistaria formosa*, *Robinia pseudoacacia* f. *dependens* and f. *erecta*, × *R. Slavinii*, × *R. ambigua* var. *bella-rosea* (Nichols), *Caragana frutex* var. *macrantha*, *Desmodium Franchetii*, *D. spicatum*, *Pinus resinosa* f. *globosa*, *Ulmus americana* f. *columnaris*, *Hydrangea opuloides* var. *japonica* f. *coerulea* (Hook.), × *Vitis Slavinii*, × *V. Andersonii*, × *Cornus Dunbarii*, × *C. Horseyi*, × *Rhododendron holmleaense*, *R. obtusum* × var. *arnoldianum*, × *Ligustrum ibolium* Coe, *Viburnum dilatatum* f. *xanthocarpum.—Alfred Rehder.*

4863. Robinson, B. L. **Records preliminary to a general treatment of the Eupatorieae,—I.** Contrib. Gray Herb. **64**: 1–21. 1922.—Some 28 species of the *Eupatorieae* native to Mexico, Central America, the West Indies, and South America are discussed in more or less detail. A key is given to those species of *Mikania* closely related to *M. parviflora* (Aubl.) Karst. and another to the group of species here termed the *Globosae* that are closely related to *M. Williamsii.* Nineteen new species, 2 new forms, and 1 new name are given as follows: *Ageratum Arsenei*, *Stevia micradenia* (*S. laxa* Robinson & Seaton, not Hook. & Arn.), *Mikania acutissima* Rusby, *M. Aristei*, *M. Buchtienii*, *M. desmocephala*, *M. dictyophylla*, *M. eucosma*, *M. flaccida*, *M. Holwayana*, *M. incasina*, *M. jamaicensis*, *M. Joergensenii*, *M. Johnstonii*, *M. leiostachya* Benth. forma *typica*, *M. leiostachya* Benth. forma *irrasa*, *M. lorciensis*, *M. oreopola*, *M. pycnadenia*, *M. Rusbyi*, *M. Schultzii*, *M. Williamsii.—E. B. Payson.*

4864. Robinson, B. L. **The Mikanias of northern and western South America.** Contrib. Gray Herb. **64**: 21–116. 1922.—The author presents separate treatments of the 32 known species of *Mikania* that are native to Colombia, the 13 native to Venezuela, the 18 native to Ecuador, the 37 native to Peru, and the 28 native to Bolivia. A bibliography is given of the most important references to the species of each country. Keys to the sections and species are given for each country together with descriptions of each species, references to literature, and citations of specimens seen.—*E. B. Payson.*

4865. Sargent, C. S. **Notes on North American trees, IX.** Jour. Arnold Arboretum **3:** 1–11. 1921 [1922].—The present article deals with new species and varieties of *Crataegus* and the following new species, 1 new form, and 1 hybrid are described: *Crataegus cherokeensis, C. phaneroneura, C. limnophila, C. sublobata, C. intermixta, C. araioclada, C. subpilosa, C. transmississippiensis, C. brachyphylla,* × *C. notha, C. brachyacantha* f. *leucocarpa,* and *C. nuda.* —*Alfred Rehder.*

4866. Schlechter, R. **Die Asclepiadaceen von Mikronesien.** [**The Asclepiadaceae of Micronesia.**] Bot. Jahrb. **56:** 565–569. 1921.—This is No. 22 of the series, Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. Diels. Only 6 species are found in the islands, of which 4 are endemic. They belong to 5 genera. *Ascelpias curassavica* L. is introduced. Keys, descriptions, and notes are given. *Hoya Schneei* is described as new.—*K. M. Wiegand.*

4867. Schlechter, R. **Die Elaeocarpaceen von Mikronesien.** [**The Elaeocarpaceae of Micronesia.**] Bot. Jahrb. **56:** 562–564. 1921.—This is No. 21 of the series, Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. Diels. Micronesia is much poorer in Elaeocarpaceae than the Papua Islands, due partly without doubt to extermination caused by the cutting of useful timber. Still these 2 groups of islands are undoubtedly closely related floristically. Keys, descriptions, and notes are given on the 3 species listed. *Elaeocarpus Kerstingianus* and *E. Gibbonii* are described as new.—*K. M. Wiegand.*

4868. Schlechter, R. **Die Gesneraceen von Mikronesien.** [**The Gesneraceae of Micronesia.**] Bot. Jahrb. **56:** 576–577. 1921.—This is No. 24 of the series, Beiträge zur Flora von Mikronesien und Polynesien II. edited by L. Diels. Only 2 species are known from these islands, *Cyrtandra Urvillei* C. B. Clarke and *C. palawensis* n. sp.—*K. M. Wiegand.*

4869. Schlechter, R. **Die Orchidaceen von Mikronesien.** [**The Orchidaceae of Micronesia.**] Bot. Jahrb. **56:** 434–501. *Fig. 1–3.* 1921.—This is No. 3 of the series, Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. Diels. Many species have been added to the known flora of Micronesia (including Marianne and Caroline Islands) since the author's previous account in Bot. Jahrb. 52: 1914. Ledermann's explorations were brief, being confined to 5 months in 1913 and 1914, and only a few of the islands were visited. The wealth of this flora is yet only suspected. Sixty-eight species, in 37 genera, are now known. The area covered by the paper is from the equator to 21° N. lat. and 131° to 173° E. long. The geological nature of the islands is discussed. A detailed historical account of the explorations is given. A table shows the occurrence of the different genera in the various island-groups, also the number of species in each genus, and the number of endemic species, which is 85 per cent of the total. The necessity for botanical exploration, before cultivation has exterminated the wild flora, is emphasized. The orchids are all of Papuasian affinity. The flora does not uphold Hans Meyer's contention that the Marianne Islands, Yap, and Palau Island were a part of the continental rim of Asia. Interesting notes on several species are given; and it is remarked that 23 species of green terrestrial orchids occur, most of which are in shady humus of the bush. *Dendrobium* is the only genus with more than 10 species, while 25 genera are monotypic in this flora. Keys to the genera and species are given. The following species and varieties are described as new: *Habenaria carolinensis, Nervilia palawensis, Didymoplexis fimbriata, Moerenhoutia leucantha* and var. *glabrata, M. laxa, Hetaeria Raymundi, Vrydagzenia micronesiaca, Corymbis Ledermannii, Microstylis Volkensii, M. palawensis, M. calcarea, M. Kerstingiana, M. setipes, Oberonia palawensis, Dendrobium elongaticolle, D. flavicolle, D. Kerstingianum, D. Amesianum, D. brachyanthum, D. violaceo-miniatum, D. ponapense, D. carolinense, Pseuderia micronesiaca, Mediocalcar ponapense, Agrostophyllum palawense,* *Aglossorhyncha micronesiaca*, *Bulbophyllum micronesiacum*, *B. Gibbonianum*, *B. ponapense*, *Phreatia carolinensis*, *P. ponapensis*, *Rhynchophreatia palawensis*, *Chilochista Loheri*, *Trixspermum arachnitiforme*, *Vandopsis Raymundi*, *Trichoglottis Ledermannii*, *Taeniophyllum palawense*, and *T. petrophilum*. The genus **Rhynchophreatia** is proposed as new.—*K. M. Wiegand.*

4870. Schlechter, R. **Die Scrophulariaceen von Mikronesien. [The Scrophulariaceae of Micronesia.]** Bot. Jahrb. **56**: 570–575. 1921.—This is No. 23 of the series, Beiträge zur Flora von Mikronesien und Polynesien II, edited by L. Diels. Ten species are known, belonging to 6 genera. None of these is endemic. Heretofore several have been misunderstood. The following new names are proposed: *Limnophila fragrans* (Forst.) Seem. var. *brevis* n. var., *L. indica* (L.) Merr. var. *Raymundi* n. var., and *Lindernia pusilla* (*Gratiola pusilla* Willd.).—*K. M. Wiegand.*

4871. Schlecter, R. **Revision der Gattungen Schizochilus Sond. und Brachycorythis Ldl. [Revision of the genera Schizochilus Sond. and Brachycorythis Ldl.]** Beih. Bot. Centralbl. II Abt. **38**: 80–131. 1921.—The author reviews the *Platanthera* group of the Orchidaceae, especially the genera named in the title. The characteristics of these genera are given together with keys to the species. Species descriptions follow. *Brachycorythis* is divided into 4 sections with 23 species; *Schizochilus* contains 25 species. Two new genera are described, **Gyaladenia** with 3 species and **Diplacorchis** with 5. Of the 56 species, 21 are described as new. These are: *Schizochilus Culveri*, *S. albiflos*, *S. tenellus*, *S. Galpinii*, *S. pulchellus*, *S. caffrus*, *S. Bolusii*, *S. Rudatisii*, *S. clavatus*, *S. Baurii*, *S. Huttonae*, *S. Woodii*, *S. grandiflorus*, *S. grandiflorus* var. *crenulata*, *Brachycorythis Baumii*, *B. Stolzii*, *B. sudanica*, *B. sceptrum*, *Schwartzkopffia angolensis* (*Brachycorythis pumilio* Rchb. f.), *Diplacorchis Engleriana* (*Brachycorythis Engleriana* Kränzl.), and *D. angolensis*. The following new combinations appear: *Brachycorythis hispidula* (*Peristylus hispidulus* Rendle, *Platanthera hispidula* Gilg, *Brachycorythis Goretzeana* Kränzl.), *B. inhambanensis* (*Platanthera inhambanensis*), *B. angolensis* (*Plantanthera angolensis* Schltr.), *Gyaladenia Mac-Owaniana* (*Brachycorythis Mac-Owaniana* Rchb. f., *Habenaria Mac-Owaniana* N. E. Br., *Gymnadenia Mac-Owaniana* Schltr.), *G. rhodostachys* (*Platanthera rhodostachys* Schltr.), *G. Friesii* (*Platanthera Friesii* Schltr.), *Diplacorchis tenuior* (*Brachycorythis tenuior* Rchb. f., *Platanthera tenuior* Schltr.), *D. rhomboglossa* (*Brachycorythis rhomboglossa* Kränzl., *Epipogon Kassnerianum* Kränzl.), *D. disoides* (*Habenaria disoides* Ridl., *Brachycorythis disoides* Kränzl.).—*L. Pace.*

4872. Schulz, O. E. **Eine Crucifere der Karolinen. [A cruciferous plant of the Caroline Islands.]** Bot. Jahrb. **56**: 507. 1921.—This is No. 6 of the series, Beiträge zur Flora von Micronesien und Polynesien II, edited by L. Diels. *Brassica integrifolia* (West) O. E. Schulz var. *timoriana* (DC.) O. E. Schulz is noted from several of the eastern Caroline Islands.—*K. M. Wiegand.*

4873. Sprague, T. A. **A revision of the genus Capraria.** Kew Bull. **1921**: 205–212. 1921.—Five species are recognized in this tropical American genus of Scrophulariaceae. A key for the identification of the species is provided. Certain of the species have been cultivated for their medicinal properties and the leaves have long been used for tea.—*E. Mead Wilcox.*

4874. Sprague, T. A. **Phellodendron.** Kew Bull. **1920**: 231–235. 1920.—The author makes a new combination, *Phellodendron amurense* Rupr. var. *Lavallei* (*P. Lavallei* Dode).—*E. Mead Wilcox.*

4875. S[prague], T. A., and J., H[utchison]. **Semiaquilegia ecalcarata.** Kew Bull. **1921**: 174–175. 1921.—This species, for which this new combination is here proposed, is based on *Aquilegia ecalcarata* Maxim., and occurs in alpine woods in Kansu.—*E. Mead Wilcox.*

4876. Sprague, T. A. **Stellaria or Alsine.** Kew Bull. **1920**: 308–318. 1920.—Critical notes on *Alsine* are given, and the application of this name to *Stellaria*, *Spergularia*, and *Minuartia* is discussed.—*E. Mead Wilcox.*

4877. Sprague, T. A., and L. A. M. Riley. **Notes on Raimannia and allied genera.** Kew Bull. 1921: 198–201. 1921.—Critical notes are given on this and other genera which have at various times been segregated from the genus *Oenothera* established by Linnaeus in 1753. The following new combinations are published: *Raimannia Berteriana, R. coquimbensis, R. indecora, R. longiflora, R. mendocinensis, R. mollissima, R. nocturna, R. odorata,* and *R. punae.—E. Mead Wilcox.*

4878. Standley, Paul C. **Trees and shrubs of Mexico (Fagaceae-Fabaceae).** Contrib. U.S. Nation. Herb. 23: 171–515. 1922.—The 2nd part of Standley's work on the trees and shrubs of Mexico closely follows the 1st part [see Bot. Absts. 8, Entry 744] in plan. Under the families the genera and species are keyed, and brief descriptions, accompanied by synonymy and range are given. The Mexican vernacular names and uses are given in full, and notes on the uses and medicinal or chemical properties of the genera in other regions are often added. The largest genera are *Quercus*, with 112 species, the treatment of which is contributed by W. Trelease; *Parosela*, 106; *Mimosa*, 67; *Acacia*, 64; *Phoradendron*, 57; *Cassia*, 51. The following new species and new names occur, all by Standley except as noted: *Quercus pinalensis* Trel. (*Q. cuneifolia*, Liebm., not Raf.), *Q. Standleyi* Trel., *Q. Martensiana* Trel. (*Q. affinis* Mart. & Gal., not Scheidw.) *Q. Greggii* (A. DC.) Trel., *Q. aculcingensis* Trel. (*Q. reticulata crassifolia* Oerst.), *Q. intricata* Trel. (*Q. microphylla crispata* A. DC.), *Q. Eduardi* Trel. (*Q. oligodonta* Seemen, not Saporta), *Q. chicamolensis* Trel. (*Q. mollis* Mart. & Gal., not Raf.), *Q. uruapanensis* Trel. (*Q. nitida* Mart. & Gal., not Raf.), *Q. major* (A. DC.) Trel., *Q. huitamalcana* Trel. (*Q. serra* Liebm., not Unger), *Coccoloba lapathifolia, C. Goldmanii, Ruprechtia macrosepala, R. pallida, Achatocarpus oaxacanus, Odostemon Ehrenbergii* (Kunze), *O. tenuifolius* (Lindl.), *O. lanceolatus* (Benth.), *O. Hartwegii* (Benth.), *O. ilicinus* (Schlecht.), *O. Andrieuxii* (Hook. & Arn.), *O. pallidus* (Hartw.), *O. zimapanus* (Fedde), *O. Paxii* (Fedde), *O. gracilis* (Benth.), *O. angustifolius* (Hartw.), *O. incertus* (Fedde), *O. eutriphyllus* (Fedde), *O. trifolius* (Cham. & Schlecht), *Guatteria depressa* (Baill.) Safford, *Sapranthus foetidus* (Rose) Safford, *S. campechianus* (HBK.), *Phoebe subtriplinervia* (Meissn.), *Capparis longipes* (*C. discolor* Standl. 1919, not Donn. Sm.), *Vauquelinia latifolia* Rydb., *Amelanchier nervosa* (Decaisne), *Prunus virens* (Woot. & Standl.), *Entada patens* (Hook. & Arn.), *Goldmania foetida* (Jacq.), *Mimosa Wootonii, Acuan fruticosum* (Rose), *Calliandra Houstoniana* (Mill.), *Bauhinia retifolia, Caesalpinia melanadenia* (Rose), *C. phyllanthoides, C. californica* (A. Gray), *Conzattia multiflora* (Rose), *C. sericea, Sophora Conzattii, Ormosia mexicana, Parosela puberula* (Parish), *P. Benthami* (Brandegee), *P. megacarpa* (S. Wats.), *P. juncea* (Rydb.), *P. tinctoria* (Brandegee), *P. dentata* (Rydb.), *P. arenaria* (Brandegee), *Brongniartia lupinoides* (HBK.), *Cracca Micheliana* (*Tephrosia major* Micheli, not *Cr. major* Alef.), *C. potosina* (Brandegee), *C. Watsoniana* (*Clitoria sericea* S. Wats., not *Cr. sericea* A. Gray), *C. Schiedeana* (Schlecht.), *Daubentonia Cavanillesii* (S. Wats.), *Diphysa macrocarpa, D. Thurberi* (A. Gray) Rydb., *Lennea brunnescens, Willardia eriophylla* (Benth.), *Hesperothamnus grandis, Meibomia Robinsonii* (*Desmodium jaliscanum obtusum* Robinson), *M. Conzattii* (Greenm.), *M. jaliscana* (S. Wats.), *M. chartacea* (Brandegee), *M. cinerea* (HBK.), *Canavalia hirsuta* (Mart. & Gal.), *Dolicholus potosinus* (Brandegee), *Galactia viridiflora* (Rose), *G. incana* (Rose), *Mucuna argyrophylla, Amerimnon granadillo, A. glabrum* (Mill.), *A. glomeratum* (Hemsl.), *Platymiscium yucatanum.—S. F. Blake.*

4879. Stapf, O. **Daturicarpa, a new genus of Apocyanceae.** Kew Bull. 1921: 166–171. *Fig. 1–2.* 1921.—The following 3 new species from Belgian Congo are described: *D. elliptica, D. lanceolata,* and *D. firmula.—E. Mead Wilcox.*

4880. Stapf, O. **Kikuyu grass (Pennisetum clandestinum Chiov.).** Kew Bull. 1921: 85–93. *1 fig.* 1921.—Taxonomic, agronomic, and ecologic notes are given on this grass discovered in 1911 on the shores of Lake Naivasha, Kikuyu.—*E. Mead Wilcox.*

4881. Stapf, O. **The botanical history of the "Sindian" and the age of Abraham's oak.** Kew Bull. 1920: 258–264. 1920.—Critical notes are given concerning *Quercus calliprinos* Webb.—*E. Mead Wilcox.*

4882. Toppin, S. M. **Notes on the balsams of Chitral and the Kachin Hills.** Kew Bull. **1920:** 345–367. *Illus.* 1920.—Notes are given on contrivances for pollination and on the dehiscence of the capsules in *Impatiens* together with critical notes on that genus in Burma. The following new species are described: *Impatiens delicata* Toppin, *I. erubescens* Dunn, *I. kamtilongensis* Toppin, *I. porphyrea* Toppin, *I. Pritchardii* Toppin, and *I. Toppinii* Dunn.—*E. Mead Wilcox.*

4883. Touton, K. **Die rheinischen Hieracien. Vorstudien zur neuen Flora der Rheinlande. [The Rhenish Hieracia. Preliminary studies for the new flora of the Rhine countries.]** Jahrb. Nassauischer Ver. Naturk. Wiesbaden **73:** 41–73. 1921.—In the present article, which represents the 1st of a series, the author begins the discussion of the numerous species of *Hieracium* occurring in Germany in the neighborhood of the Rhine. The regions investigated include the Rhine Province, the Rhine-Palatinate, Hesse, Hesse-Nassau, and a part of Baden. Only the *Pilosellae* are here considered, the other subgenera being left for the later parts of the series. Of the *Pilosellae*, 21 species, 107 subspecies, and numerous varieties and subvarieties are recognized, the various forms being accompanied by full data regarding stations and collectors and often by critical remarks. The following new species are described: *H. pseudobifurcum*, with the new subspecies *pseudosetigeriforme*, *pseudocinereum*, and *bifurcoides;* and *H. subpseudobifurcum*, with the new subspecies *subtilissimum*. Also the following new subspecies, Touton being the authority except where otherwise noted: *H. bifurcum* subsp. *pseudosetigeriforme; H. brachiatum* subspp. *Mattiacense*, *micromorphum* Zahn, *microthecum*, *pseudoadriaticum*, *subfallacinoides*, *submeladenium* Schlickum & Touton, and *subtiliforme; H. glomeratum* subsp. *Plaidtense* Schlickum & Touton; *H. pachylodes* subspp. *Mosellae*, *subminuticeps*, and *subsetosum; H. pratense* subsp. *intermedium* Schlickum & Touton; *H. prussicum* subsp. *laticeps* Schlickum & Touton; and *H. Schultesii* subsp. *flagellaripes* Schlickum & Touton. A supplement gives a series of critical notes by C. H. Zahn, whose conclusions differ in some cases from those of the author.—*A. W. Evans.*

4884. Yuncker, T. G. **Three new species of Cuscuta from Mexico.** Bull. Torrey Bot. Club **49:** 107–109. *Fig. 1–3.* 1922.—*Cuscuta dentatasquamata*, *C. cozumeliensis*, and *C. durangana* are described as new species from Mexico.—*P. A. Munz.*

4885. Zagolin, A. **Ricerche sul polimorfismo del frutto della Chamaerops humilis L. [Studies on the polymorphism of the fruit of Chamaerops humilis L.]** Nuovo. Gior. Bot. Ital. **28:** 36–66. *Pl. 1–2.* 1921.—In their natural state are found micro- and macrocarpous forms; also freaks, or at least forms which are more or less unusual. The shape or size of the fruit is a character by which are grouped 9 out of the 13 forms studied. With the exception of one, all forms exist in the cultivated state. Improvement of soil, change in climate, and cultural practices have not been factors potent in the transformation of micro- into macrocarpous forms. In the development of the macrocarpous form, cultural practices have probably had some influence, but it is pointed out that macrocarpous forms are found in the natural habitat, that they are being cultivated in different localities and provinces, and that it is very likely that the cultivated forms have been derived from preëxisting indigenous forms—not from a single parent, but presenting polyphyletic origin. The varieties *lusitanica* and *confusa*, grown in Spain, have similar fruit characters,—*confusa* closely resembling *dactylocarpa*, which is grown in Italy. There appear to be definite geographically limited races and it will be necessary to study this palm where it is most widely distributed.—*Ernst Artschwager.*

MISCELLANEOUS

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4886. Anonymous. **Jute and silk in India.** [Rev. of: **Indian trade inquiry: Reports on jute and silk.** *ix + 90 p.* John Murray: London, 1921.] Nature **109:** 170. 1922.

4887. Conn, H. J. **The standardization of stains.** [Abstract.] Absts. Bact. **6**: 2. 1922.

4888. Dobbs, C. M. **Curious growth of wild rubber vine.** Jour. East Africa and Uganda Nat. Hist. Soc. **5**: 416. 1919.—This is a note on a vine growing through the trunk of a tree.—*Wm. Randolph Taylor.*

4889. Exton, William G. **Self-standard colorimeter.** [Abstract.] Absts. Bact. **6**: 37. 1922.

4890. Exton, William G. **Self-standard turbidimeter.** [Abstract.] Absts. Bact. **6**: 37. 1922.

4891. Exton, William G. **The euscope.** [Abstract.] Absts. Bact. **6**: 37. 1922.

4892. Gershenfeld, Louis. **Dehydrated products in commerce and in the sciences.** Jour. Amer. Pharm. Assoc. **11**: 86–90. 1922.—The author discusses the dehydration of various fruits and vegetables, meats, milk, eggs, fish, and (among the products used in the sciences) immunized blood sera and culture media.—*Anton Hogstad, Jr.*

4893. Herrmann. **Die neue Polizeiverordnung über den Schutz seltener Tiere und Pflanzen.** [New regulation concerning protection of rare animals and plants.] Deutsch. Forstzeitg. **36**: 832–834. 1921.—The text is given of an ordinance issued July 26, 1921, carrying out the provisions of a law of 1920. Certain animals (chiefly birds) and plants, which are listed, are put on the protected list. In the case of the plants, neither the whole plant nor its roots, branches, or flowers may be dug up, broken off, picked, or destroyed at any season of the year. Fourteen plants are included in the list. Owners or other persons entitled to use of the particular piece of land involved are not affected.—*W. N. Sparhawk.*

4894. Lavalle, F. P., y Pablo Lavenir. **Utilización de la turba como combustible.** [Utilization of peat as fuel.] An. Soc. Cien. Argentina **90**: 205–226. *Fig. 2.* 1920.—The authors made a study of the nature and composition of peats from various parts of the Argentine Republic. Their work included a study of distillation products and of briquettes obtained by compression.—*A. Bonazzi.*

4895. Pearson, Raymond A. **A national policy for agricultural research.** Science **55**: 299–305. 1922.—The author makes a strong plea for provision for agricultural research and gives 8 essentials of a strong national policy.—*C. J. Lyon.*

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